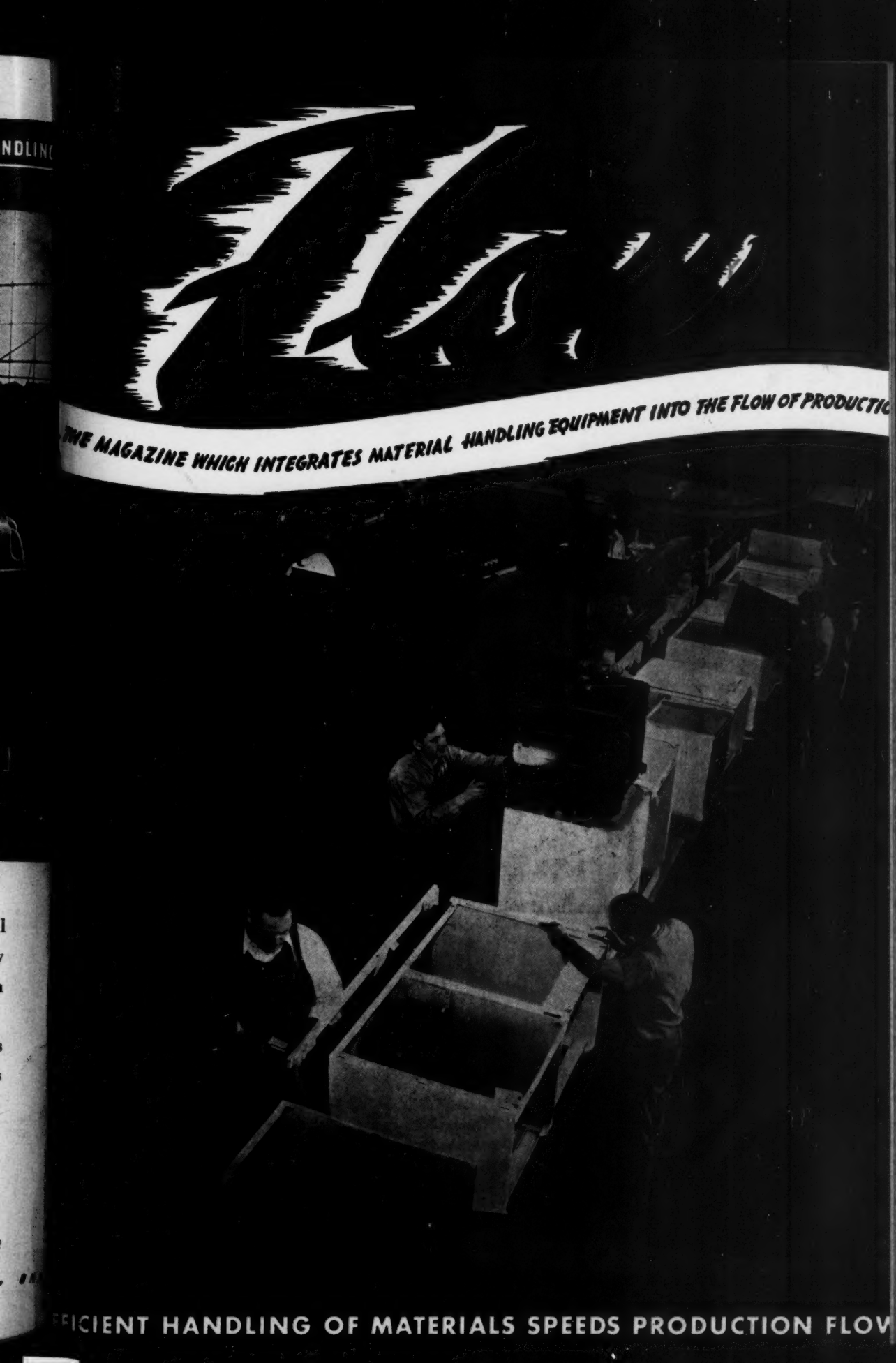
Flow

THE MAGAZINE WHICH INTEGRATES MATERIAL HANDLING EQUIPMENT INTO THE FLOW OF PRODUCTIO



FICIENT HANDLING OF MATERIALS SPEEDS PRODUCTION FLOW

Economies

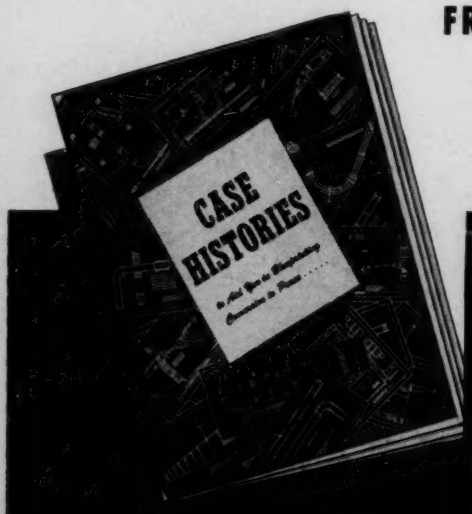
● Fearful of being "too late with too little," American industry won its race against time. Quantity and quality surpassed the hopes of all but the most courageous and progressive.

One of the contributing factors to victory was the *general advancement in mechanical materials-handling,* and most particularly in routing materials in process through successive stages of manufacture. Substantial savings in manpower, time and costs accrued. Production consistently increased, meriting a steady flow of "E" awards.

Lamson Conveyors, through many ingenious applications, devised by Lamson engineers, showed industry throughout the length and breadth of the country, new speeds and economies in materials-handling.

The rewards of Lamson achievement are now available to you . . . and in practice are essential to the competition which is following reconversion.

To Assist You In Today's Planning, We'd Like To Send The FREE BOOK "CASE HISTORIES" . . .



It will aid you in blueprinting conversion to peacetime conditions . . . come inside some of America's greatest industries with us . . . and see how they will handle the problems of increased output at lower costs. Write for your copy today.

LAMSON CORPORATION
1300 Lamson St., Syracuse 1, N. Y.
Please send me a copy of your reconversion booklet, "Case Histories."

Name..... Position.....
Company.....
Address.....
City and Zone..... State.....

Flow

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Flow

THE BOLIVAR PUBLISHING CO.
812 HURON ROAD,
CLEVELAND 15, OHIO

Let me cut your handling costs in HALF!

. Muscle Mike CAN with this Brawny Midget of Electric Trucks

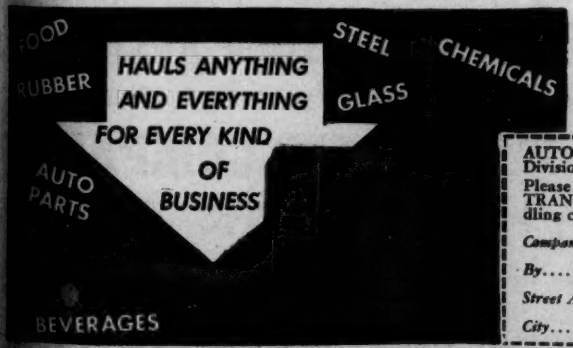
All industry is using this Miracle Electric Truck. In its motor is a Muscle Mike . . . a brawny midget of electric power that moves up to 6000 pounds with amazing "touch-of-your-thumb" ease.

Its name is Automatic Transporter. You haven't a handling job it can't lick. One man or girl at the control buttons does the work of three husky laborers. That's two-thirds saving in labor alone. Forget about drudgery and fatigue. It's next to nothing. Take it in and out of tight places that would put even hand trucks to shame. It comes through for you without a whimper.

Thousands of these industry-tested Automatic Transporters have been making sensational performance records in every kind of business. Increased production now makes it available to *you*. But for a while the order will have to be "First come, first served!" Mail the coupon so that we can hurry you the complete facts.

Remember: Only AUTOMATIC makes the TRANSPORTER

Transporter
A PRODUCT OF AUTOMATIC
Lightens LIFE'S LOADS



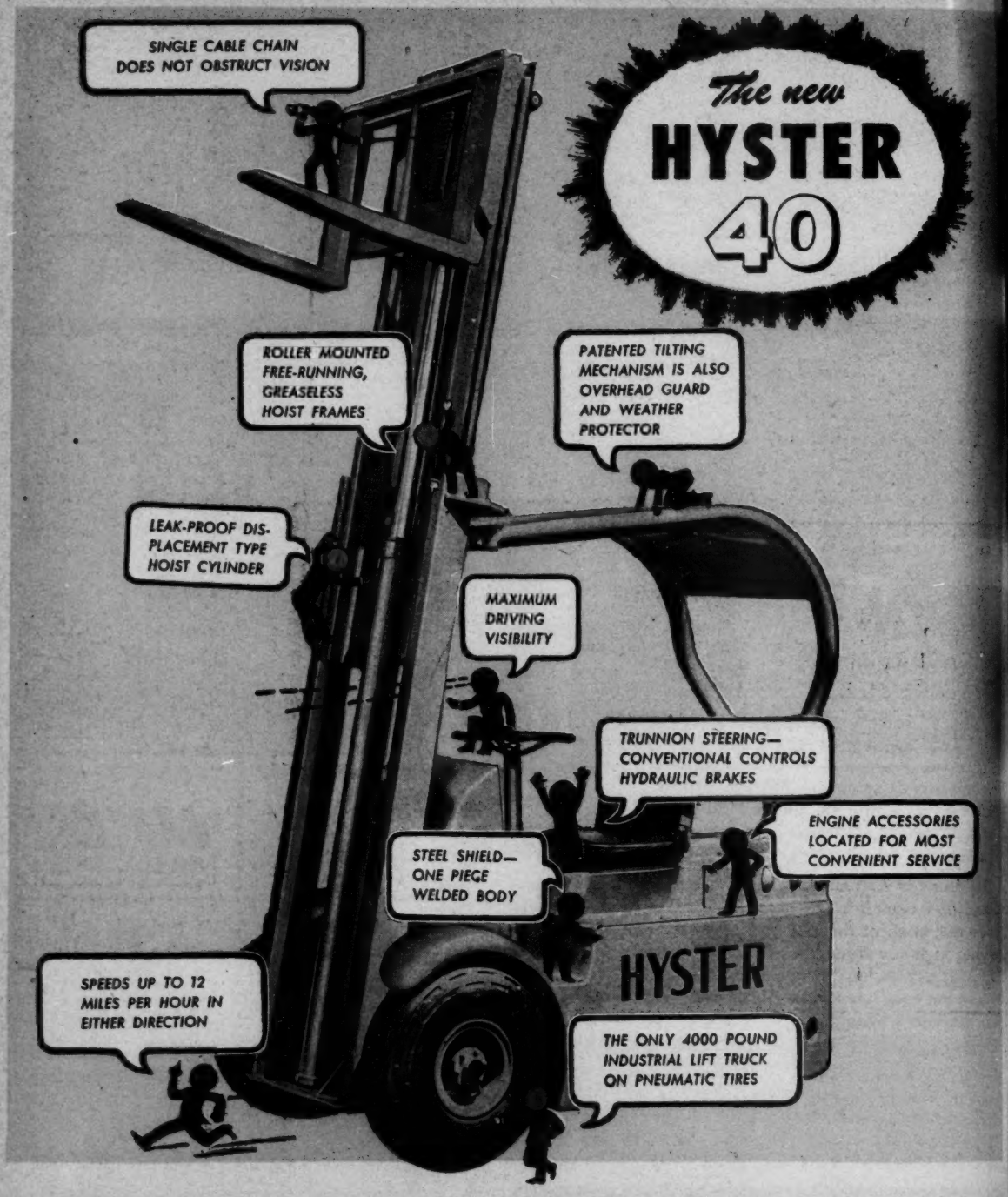
AUTOMATIC TRANSPORTATION COMPANY
Division of The Yale & Towne Mfg. Co., 69 W. 87th St., Dept. A, Chicago 20, Ill.
Please mail me, without cost or obligation, complete facts about AUTOMATIC TRANSPORTER, the Miracle Electric Truck . . . plus *proof* that it will cut my handling costs in half.

Company Name.....

By.....*Position*.....

Street Address.....

City.....*State*.....


SINGLE CABLE CHAIN DOES NOT OBSTRUCT VISION
The new HYSTER 40
ROLLER MOUNTED FREE-RUNNING, GREASELESS HOIST FRAMES
PATENTED TILTING MECHANISM IS ALSO OVERHEAD GUARD AND WEATHER PROTECTOR
LEAK-PROOF DISPLACEMENT TYPE HOIST CYLINDER
MAXIMUM DRIVING VISIBILITY
TRUNNION STEERING— CONVENTIONAL CONTROLS HYDRAULIC BRAKES
ENGINE ACCESSORIES LOCATED FOR MOST CONVENIENT SERVICE
STEEL SHIELD— ONE PIECE WELDED BODY
HYSTER
SPEEDS UP TO 12 MILES PER HOUR IN EITHER DIRECTION
THE ONLY 4000 POUND INDUSTRIAL LIFT TRUCK ON PNEUMATIC TIRES

ANOTHER NEW HYSTER PROFIT-MAKER FOR YOUR BUSINESS!

A 4000-pound Industrial Lift Truck on pneumatic tires!

The new Hyster "40", with 2-ton lifting, transporting, stacking capacity *has the ability to solve 7 out of every 10* materials handling problems in the average business... Pneumatic tires for fast, smooth work, indoors and outdoors. Gasoline powered. Powerful, efficient hydraulic lifting mechanism. Many new engineering improvements. Easy to operate. Easy to service.

The new Hyster "40" is fully illustrated and described in Bulletin 1016. Write for your copy.

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HYSTER COMPANY

2931 N. E. Clackamas St., Portland 8, Oregon
1831 North Adams Street, Peoria 1, Illinois

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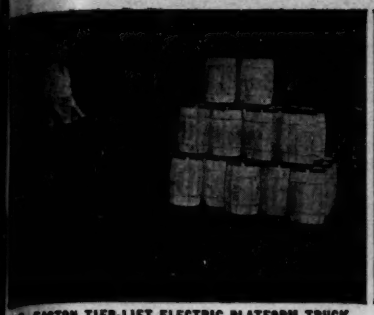
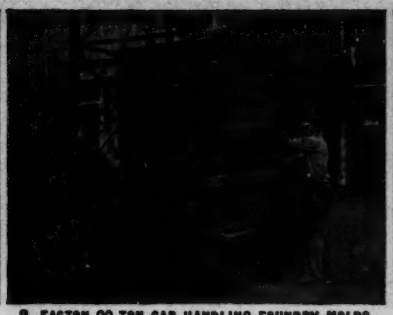
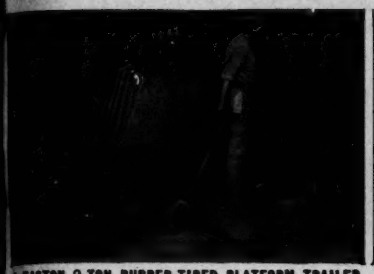


1. EASTON TIER-LIFT ELECTRIC PLATFORM TRUCK



2. EASTON 20-TON CAR HANDLING FOUNDRY MOLDS

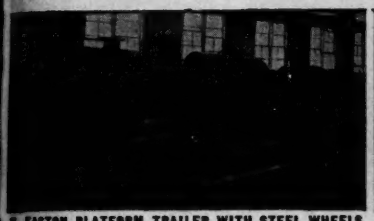
3. EASTON SPECIAL LARGE CAPACITY CORE-OVEN CAR



4. EASTON 2-TON RUBBER-TIRED PLATFORM TRAILER

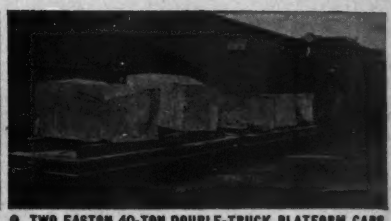
5. A VETERAN EASTON TIER-LIFT ELECTRIC TRUCK

6. EASTON RUBBER-TIRED STOCKROOM TRAILER

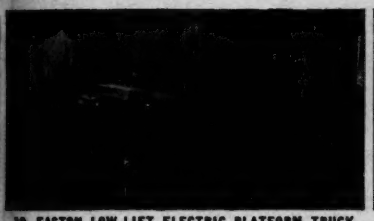


7. EASTON PLATFORM TRAILER WITH STEEL WHEELS

8. EASTON LOW-LIFT TRUCK PUSHING PLATFORM CAR



9. TWO EASTON 40-TON DOUBLE-TRUCK PLATFORM CARS



10. EASTON LOW-LIFT ELECTRIC PLATFORM TRUCK

11. EASTON 5-TON PLATFORM CAR, TIMKEN BEARINGS

12. EASTON OPEN FRAME TRAILER, 5000 LBS. CAPACITY

AN INTEGRATED ENGINEERING SERVICE TO MEET YOUR HANDLING PROBLEMS . . .

ALL of these EASTON-engineered electric lift trucks, industrial cars and trailers are serving *one* manufacturing plant. The complexity of light and heavy, routine and highly specialized handling and production operations helps to illustrate the scope of EASTON's integrated engineering service. Plant managers and engineers who are faced with a similar variety of flow and handling problems find it convenient and helpful to refer their questions to

Engineering Counsel, Easton Car & Construction Co., Easton, Pa.

EASTON

TRAILERS · TRUCK BODIES
CARS · ELECTRIC TRUCKS

ENGINEERED

A-1009

Important Facts to Consider...

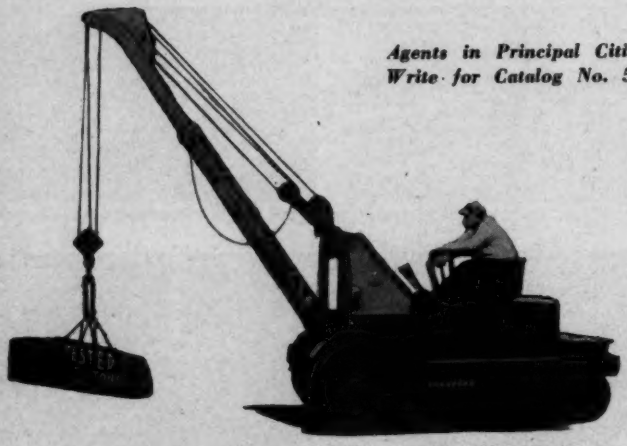
When You Buy a Mobile Crane

Until 15 years ago, only one type of Mobile Crane was available—an industrial tow tractor with a boom mounted on the front end and a winch on the rear end. When the load was lifted, steering became difficult and traction was lost; swing of the boom and travel with the load were unsafe, if not impossible.

Then came KRANE KAR . . . a complete Mobile Crane of original design providing front-wheel drive, power swing boom, and stability without stabilizing devices.

With the advent of the War, the demand for cranes stimulated the manufacture of mobile cranes similar to the KRANE KAR. These models are OUTWARDLY similar, but are they "just as good"?

HOW CAN THE PROSPECTIVE CRANE BUYER JUDGE? Below are listed the salient features of KRANE KAR. These features are based on a LIFETIME of Automotive Crane construction—on experience gained by building thousands of KRANE KARS for industry, railroads, public utilities, municipalities. The buyer should demand ALL these features. Without ALL of them, no Mobile Crane provides the efficiency, safety of operation, and economy afforded by the famous KRANE KAR.



Agents in Principal Cities
Write for Catalog No. 58

You get ALL these features in KRANE KAR

Hoist line, boom topping and boom swinging, and travel are independently or simultaneously operable.

Automatic power cut-off at all extreme positions of boom.

Rear-wheel steer: affords shortest possible turning radius, greatest stability.

All crane and travel controls centralized for convenient handling by driver from his seat.

Positive control: automatic braking of load and boom lines . . . no slipping clutches or brakes to adjust.

Self-stabilizing: no stabilizers when swinging loads to sides.

Vision unobstructed—of the roadway and the load, right down to the ground.

Front-wheel drive: 100% traction—light or loaded.

Independent full capacity power winch for boom topping increases efficiency, flexibility, and safety of operation.

Four travel speeds. 2-speed gearing for all crane operations.

Hoisting, lowering, automatic braking and holding controlled by one lever.

No tail-swing and no part of crane passes over operator.

THE ORIGINAL SWING BOOM MOBILE CRANE
WITH FRONT-WHEEL DRIVE AND REAR-WHEEL STEER

2½, 5, AND 10 TON CAPACITIES

KRANE KAR

TRADE MARK REGISTERED

SILENT HOIST & CRANE CO., 888 63rd ST., BKLYN 20, N.Y.

To FLOW:
Article Stimulates Plant Visit

I wish to extend congratulations for the splendid start you made with FLOW. I find it loaded with ideas.

Of particular interest (in the November issue) is the article on warehousing of "packing material" by Mr. Fred De Maria. As this is one big problem with us we are interested in visiting this plant and seeing just how it is accomplished. Please give us the address of the Ohio Boxboard Company.

Best wishes for your continued success.—A. D. Schiller, General Storekeeper, Corning Glass Works, Corning, New York.

Since similar letters have been received concerning this article, we are announcing for the information of other readers that the Ohio Boxboard Company may simply be addressed at Rittman, Ohio.—Ed.

To FLOW:
Needs Equipment

On page 45 of the October issue, under the column "Off the Shipping Platform," you picture a portable inclined conveyor, which is being transported by a special dolly.

I am wondering if you can advise us as to the make of this conveyor and to whom we might submit specifications for a similar one to meet our own specific needs.—G. W. Bryan, Traffic Manager, O. A. Sutton Corporation, Wichita, Kans.

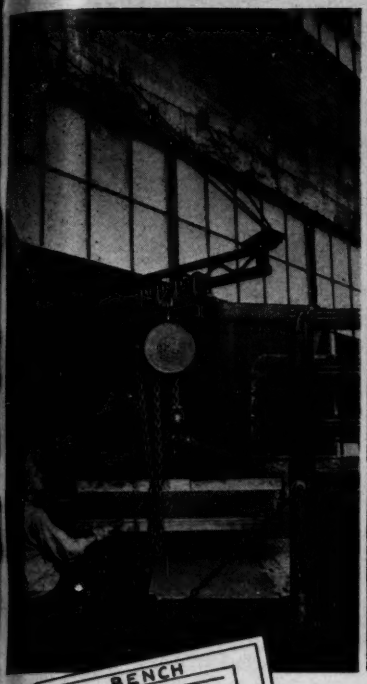
While the portable conveyor is standard equipment, the dolly was presumably made by the Navy Department.—Ed.

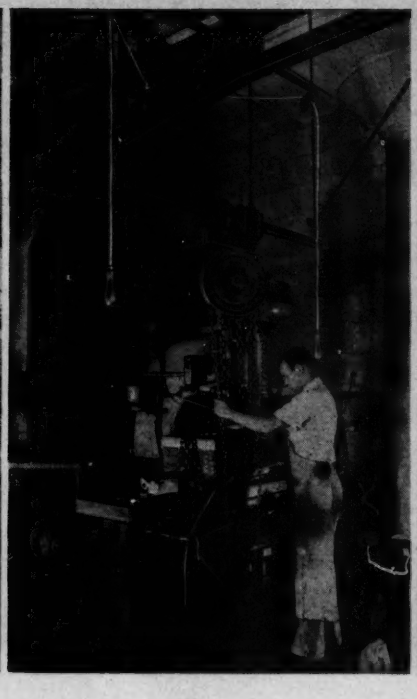
To FLOW:
What's Your Suggestion?

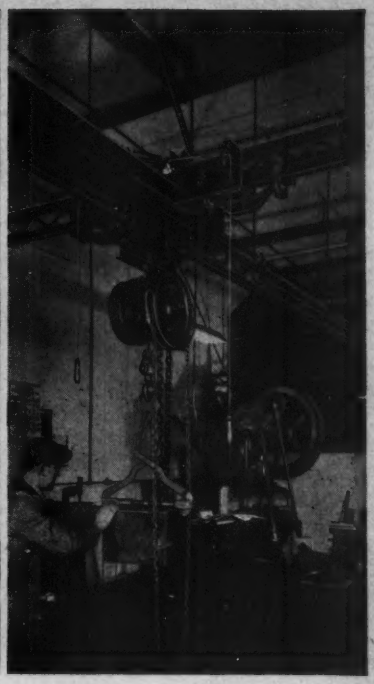
Here is a problem that has to do with the handling and storing of steel sheets.

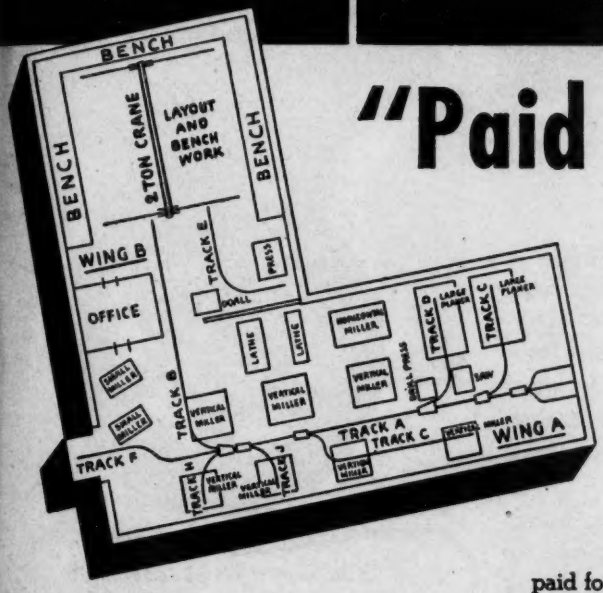
In our factory we use quite a quantity of steel sheets of several different gauges and several different sizes. These are stored in racks, with all sheets of varying gauges (but with similar widths)

(Continued on page 63)



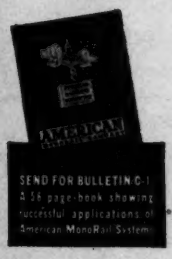






"Paid for Itself... Time and Again..."

"THIS system", says the owner, "has paid for itself time and again. Skilled die-sinkers and tool makers now work at their trade and spend little time lifting and straining to get blocks into the machines". Two ton die blocks in this small shop are handled overhead by American MonoRail. When this system was first installed it represented only a small part of the present track. Now, practically all manual handling has been entirely eliminated and every move from one machine to the other is done by American MonoRail.

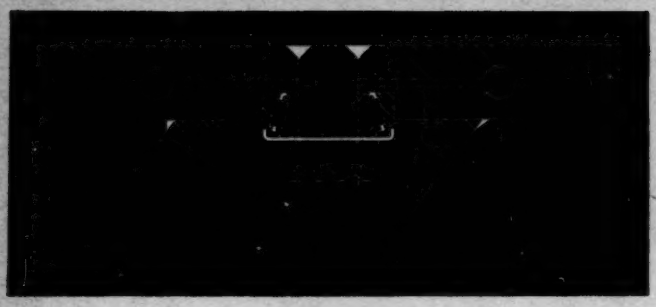


An American MonoRail engineer will show you how to handle your products in less time and for less money.

THE AMERICAN MONORAIL COMPANY

13129 ATHENS AVE. CLEVELAND 7, OHIO

BUILT FOR THE BUMPS



This is a caster especially designed for the abuse of power-pulled trailer truck service. At every vital point, there is extra strength, to give longer, trouble-free life.

Note these strong points. 5/8" diam. balls rolling in machined raceways, on a 6½" diam. ball race, with Timken roller thrust bearing. Heavy gauge steel plate in frame and top plate. Heavy-duty semi-steel or iron core rubber-tread roller-bearing wheels. Alemite pressure lubrication. 3" swivel offset.

These Bassick Trailer Casters are offered in 8", 10" and 12" sizes, with either standard or "Floating-Hub" (shock-absorbing sprung wheel) construction. Swivel or rigid type.

And for *any* caster requirement—small or large—look to Bassick for: 1, The exact type and size to fit your requirements, for Bassick makes the world's most complete line. 2, Special Bassick features that improve handling, reduce maintenance, lengthen life of casters, portable equipment and floors.

For bulletins on any caster type, write now to THE BASSICK COMPANY, Bridgeport 2, Connecticut. Division of Stewart-Warner Corporation. Canadian Division: Stewart-Warner-Alemite Corporation, Ltd., Belleville, Ontario.

You save a lot of labor
And speed production faster
When anything you want to move
Is on a Bassick Caster.

SEE OUR CATALOG IN SWEET'S

Making more kinds of Casters... Making Casters do more

Bassick

EXIDE-IRONCLAD POWER PROVIDES THE THREE "HIGHS" THAT ASSURE FULL SHIFT AVAILABILITY

Exide-Ironclads have the *high power ability* needed to meet the higher kilowatt demands encountered in frequent "stop and go" service . . . they provide *high maintained voltage* throughout discharge, assuring a uniform rate of operations . . . and their *high capacity* keeps electric industrial trucks steadily on the job throughout each shift.

These—with Exide dependability, long-life, ease of maintenance and safety—assure "full shift availability," plus the increased tonnage and greater economy that result.

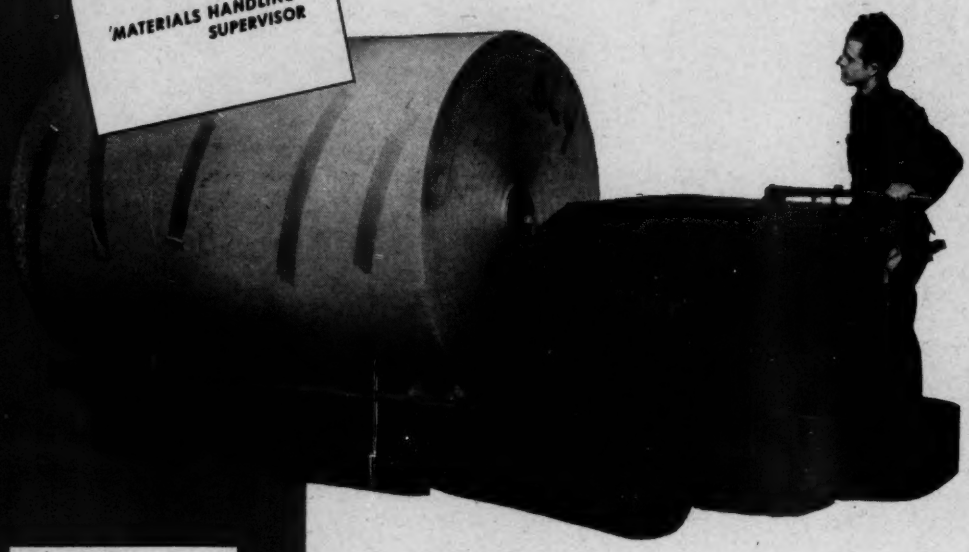
Write us for a FREE copy of the bulletin "Unit Loads" prepared by The Electric Industrial Truck Association. It tells how to cut handling costs up to 50% . . . covers latest developments in materials handling . . . and includes actual case histories.

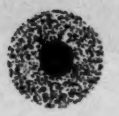
POWER

Exide
IRONCLAD
BATTERIES

THE ELECTRIC STORAGE BATTERY COMPANY, Philadelphia 32 • *Exide Batteries of Canada, Limited, Toronto*

WHAT ARE YOUR *Battery Replacement* COSTS?





BLACK OXIDE
Made by a special Gould process each grain of Black Oxide active material has a core of pure lead. Normal cell action converts this to active material as needed.

Gould Kathanode power will speed your electric truck operation throughout the entire service life of the battery. You will not have to replace it because of failing power after a few months of use.

One reason why Gould delivers 100% or more of its rated capacity through years of service is the large positive plate filled with Black Oxide active material. Developed by Gould engineers this active material has unique regenerative properties. As the outer surface is used up new material takes its place. Capacity is maintained.

Avoid operational slow-downs and premature battery replacement by powering with Gould. Write Dept. 101 for Catalog 100 on Gould Kathanode Glassklad Batteries for Industrial Truck and Tractor Service.

GOULD

Rack'em **stack'em** **and strap'em with steel**

. . . that's PALLETIZING

Aircraft cylinders, for instance. Just one on the loose can work havoc on a whole shipment. But let products pack themselves in trays, one tray on top of another and then locked together with steel strapping and you've got a package you can ship by rail, water or air . . . anywhere, anyhow, in perfect safety. That's palletizing.

Palletizing with Stanley Steel Strapping welds products and pallets into compact, one-man packages. Unpacks as easily as it packs. The Stanley Steel Strapping System includes tools, reels and accessories.

THE STANLEY WORKS, STEEL STRAPPING DIVISION
NEW BRITAIN, CONNECTICUT

STANLEY

TRADE MARK

STEEL STRAPPING AND CAR BANDING SYSTEMS

MEET ALL FEDERAL STRAPPING SPECIFICATIONS

if you're
moving materials 200 feet or more...

DO IT QUICKER, CHEAPER WITH THE...

FORK TRUCK "TRACKLESS TRAIN" SYSTEM

Industry can well profit from close study of the improvements in materials handling technique developed by the supply divisions of our armed forces. Of particular interest is the wide use of the Fork Truck—"Trackless Train" System for handling materials when distances exceed 200 ft.

In the system the fork truck (a handling and stacking machine) is used for loading trailers. Loaded trailers are made up into trains and hauled away by a tractor. "The Trackless Train" has no fixed path and may travel anywhere that necessity dictates. At destination, the fork truck removes and stacks the pallet loads to ceiling heights.

A few of the many advantages of the system are:

(1) Equipment works continuously—"dead heading" reduced to the minimum.

(2) Handles larger loads—one trailer train is equivalent to 5 to 10 truck loads.

(3) Less manpower required.

(4) Lower investment in equipment for handling comparable volume.

(5) Lower power consumption in transporting; only the tractor consumes power.

These handling advantages are also available to you. For the complete story ask to have a Mercury Engineer call—or write for Bulletin 7-11.

THE MERCURY MANUFACTURING COMPANY
4154 South Halsted Street · Chicago 9, Illinois

MERCURY

TRACTORS · TRAILERS · LIFT TRUCKS

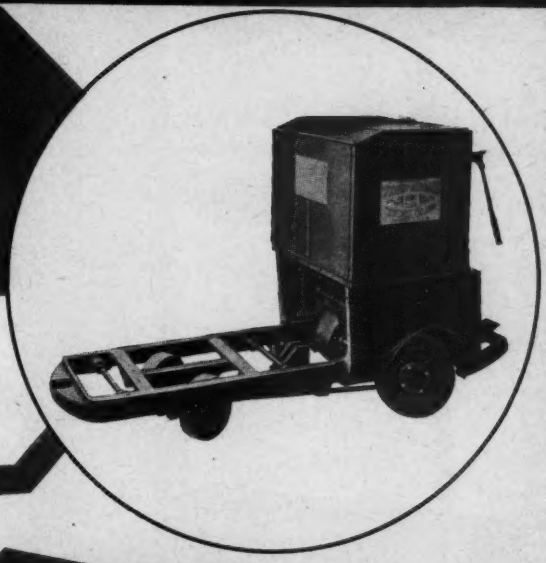
HANDLE Mercury "Yank" fork truck loading sheet steel on waiting trailers.

HAUL A train of loaded trailers is coupled to the Mercury "Banty" gas tractor and hauled to destination. The "Trackless Train" has no fixed path and may travel anywhere necessity dictates.

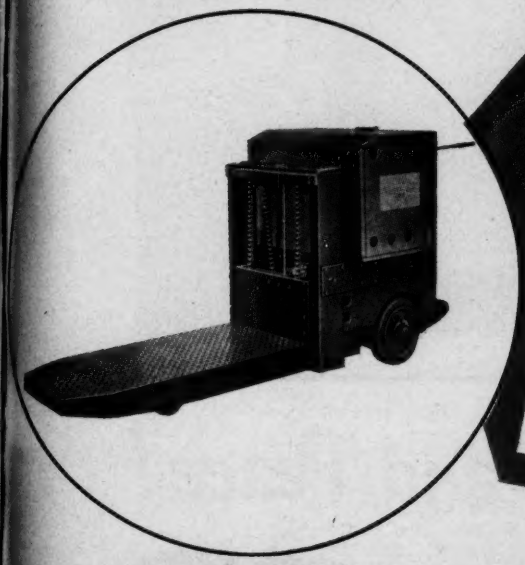
STACK At destination the tractor is uncoupled and sent on its way. The "Yank" removes the loads from the trailers and stacks them to ceiling heights.

You Can't Go Wrong Using the WRIGHT *Truck!*

WRIGHT HIGH LIFT PLATFORM TRUCK



Truck without platform illustrated. Wheels turned to extreme position. Hardened and ground rollers are provided with oil seals and roller bearings. Platform slides over these rolls smoothly. This model available in various specifications as to platform, wheel base, etc.



WRIGHT LOW LIFT PLATFORM TRUCK

Capacity 2000, 3000 and 4000 pounds. Platform is elevated by two oversized roller chains driven by cut steel sprockets mounted on shafts which rotate on ball bearings. High and low elevating limit stops are provided together with intermediate manual control. Various models and capacities.

Let us send you our catalog which illustrates and describes the complete WRIGHT line. WRIGHT electric trucks have been manufactured for over 25 years and into each model has been built all of the experience and knowledge we have gained during this time. We were the first to manufacture the small industrial electric truck.

Watch for our next month's ad covering our new type trucks.

WRIGHT TRUCK

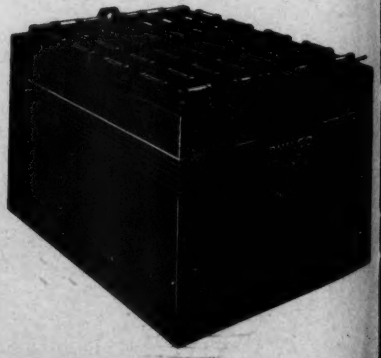
WRIGHT ELECTRIC TRUCK CO., INC.
NEW YORK

XUM

ELECTRIC TRUCKS
PALLETIZED LOADS
PHILCO BATTERIES

Big Three in War and Peace!

Now that wide war-time experience with unit loads has proved battery-powered electric trucks the most flexible, safe, cost-saving equipment for handling materials and finished goods—make this knowledge pay off! Go the whole way by powering your electric trucks with the amazing new Philco "Thirty", the high capacity battery that gives 30% longer life! It will save you money. Write for the new Philco "Thirty" catalog.



Philco Corporation, Storage Battery Division, Trenton 7, New Jersey

PHILCO FOR 50 YEARS A LEADER IN INDUSTRIAL STORAGE BATTERY DEVELOPMENT

Flow

The magazine which integrates material handling equipment into the flow of production.

Vol. 1, No. 4

JANUARY
1946

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COVER PHOTO—Another modern convenience is reaching the public—in less time and at lower cost—because of modern handling devices. Shown are electric hoists assembling automatic dish washers in the Chicago plant of the Edison General Electric Appliance Co. Immediate production plans call for 100 units daily.

The Old Way, left, was costly. Shown are over a half million hand-piled cases of fruit juice.

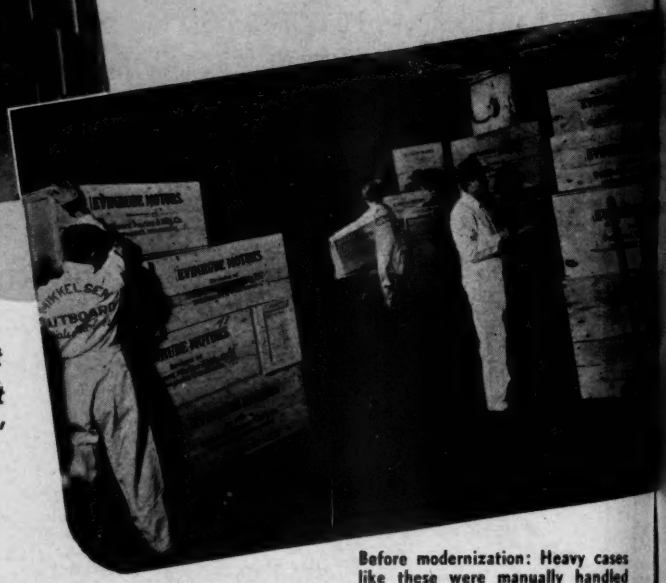
It Costs Too Much—

NOT TO!!

The Problem of Mechanization May Not Be One of "How Much It Costs",—But "How Much Will It Cost If We Don't"

By GEORGE LACAY, President

Midtown Warehouse, Inc., New York City



Before modernization: Heavy cases like these were manually handled many times.

MODERN, mechanized handling—whether in a warehouse, factory or mill—means low-cost handling, assuming of course that the mechanized devices are correctly applied. Though this seems like a truism to most of us, we yet find many executives who "hold back," or delay modernization programs, because they can't make up their minds "if it will pay." The experience of our company is typical of many other installations and is here given in the hope that it may prove enlightening.

When our company modernized its methods several years ago, the saving effected was in excess of 60 per cent over the former handling costs with manual operations. This means that our investment was amortized in a relatively short period of time. When management knows its cost and production figures, then it has a yardstick for measuring the effectiveness of the new method. This is essential and removes any guesswork expressed in the phrase "Will it pay?"

Transition, extreme left: Pallet loads beside hand-piled ones; unit loads were moved on skids; left, until the proper pallets were developed.

Step by Step Modernization

The Midtown is a general merchandise distributing warehouse using about 250,000 sq. ft. of floor space (on two floors) of a large building. Of the 500 tons of merchandise handled daily, about 60

After first year, most of warehouse was palletized.

per cent arrives by freight car, 40 per cent by over-the-road truck.

Some years ago we faced the realization that our handling costs were too high. In order to attain floor load capacity (stack goods high) and keep up the flow of material into the house, it was necessary to add more men.

Our realization of too high costs was brought home to us in another way. In 1939 warehouse rates were highly competitive. This served as an additional incentive for analyzing our costs and developing low-cost handling methods. This, we realized, was essential if we were to meet competition effectively. So, with the help of industrial engineers, we analyzed our handling operations the latter part of 1939. The findings showed that costs could be substantially reduced. Upon further investigation, we decided to adopt the recommendations of the engineers.

We did not flower forth with an over-all modernization program overnight. We added equipment gradually as experience showed that the new way was also the better and more profitable way. Because of certain limitations, we standardized on three-wheel fork lift trucks, whose light weight and compact size made them suitable for our purposes.

During the early part of 1940 we bought three of these machines chiefly for handling case goods. This initial experience showed us that we were able to increase the production of four men from 89 cases (weighing approximately 350 lbs. each) to 205 cases averaging the same weight, per day!

After that we attempted to tier case goods on skids in order to gain pile height, but this proved inadvisable. The heavy runners, intended for on-the-floor use, were not suitable for stacking purposes. Next, we began to experiment with double-face solid-deck pallets. This proved expensive because of the amount of lumber required in manufacturing. We then eliminated board feet from the pallets and found that a reasonable amount of space between deck boards proved satisfactory from the point of view of weight and cost.

In order to obtain maximum utilization of our floor area with the pallet system, we experimented with different sizes of pallets, taking into account that our posts are spaced on slightly more than 21-ft. centers. Finally we standardized on a 32″ x 40″ size, which met all conditions efficiently and permitted capacity loads for our fork trucks.

Outbound trucks were served in a matter of minutes.

"When you convert to the pallet system," an acquaintance once asked me, "what about the hand-piled stacks that are in the warehouse at the time? Should they be repiled on pallets?"

This would obviously be a waste of time and effort, entailing much rehandling. At the time we began palletization, our warehouse was pretty full. In order to avoid rehandling of the unpalletized material, palletization was adopted only for the new material arriving at the warehouse. Our old merchandise turned over fairly rapidly during this period, and at the end of about 15 months we had been able

Short boom of truck used for moving heavy coils.

to palletize about 80 to 85 per cent of the entire warehouse. During this time we also added more units to our truck fleet, until we finally had a total of 13 machines.

Important Points

A competent instructor, furnished by the truck manufacturer, spent as much time as necessary in order to train our men in efficient trucking operations. Following a period of demonstration and observation, the men were permitted to execute some of the simpler maneuvers, gradually working up to those requiring more skill and precision. The writer, incidentally, took the complete course of instruction himself. This proved valuable later when, in the absence of the instructor, the men asked questions or needed to refresh their minds on details.

Another point of importance concerns the clerical part of the work. An analysis of this was also made at the time we analyzed the manual labor operations. It seemed only logical that both phases of the work should be streamlined at the same time. We kept a complete record of how many orders, as well as how many types of orders, each clerk was handling at the window. At the end of our survey we had clear-cut information on the handling and distribution of this work as well, and made any adjustments that were necessary in the interest of greater efficiency. This not only helped avoid

(Continued on page 61)

Extra! Extra! READ ALL

THE Chicago Tribune's press room is approximately 1,000 feet distant from its paper warehouse. Although hundreds of tons of newsprint are transported daily between these two points, no over-the-road traffic is visible at any time in the area. How this is done—by means of special dollies running on a gravity-operated miniature railroad track—constitutes, visitors tell us, one of the more unusual kinds of paper handling stories. It is also a highly efficient and economical operation.

Ship With a Trunk Deck—Short Turnaround Time

During the Great Lakes navigation season—from about April 15 to December 1—more than 100,000 tons of newsprint arrive by boat from the mill at Thorold, Canada, at the Tribune's warehouse situated near the mouth of the Chicago river. The distance is approximately 800 miles.

One of the boats, the M.S. Chicago Tribune, has a specially constructed trunk deck, which increases the cubic content (and thus the capacity) by about 100 per cent. By means of this trunk, this canal-sized vessel of 259 feet over-all length is enabled to carry 3,200 tons of newsprint. The capacity of the usual kind of canal boat of the same size is about 1,500 tons.

The ships make fast alongside the warehouse and the paper is unloaded by means of shore gear—two hammerhead cranes which un-

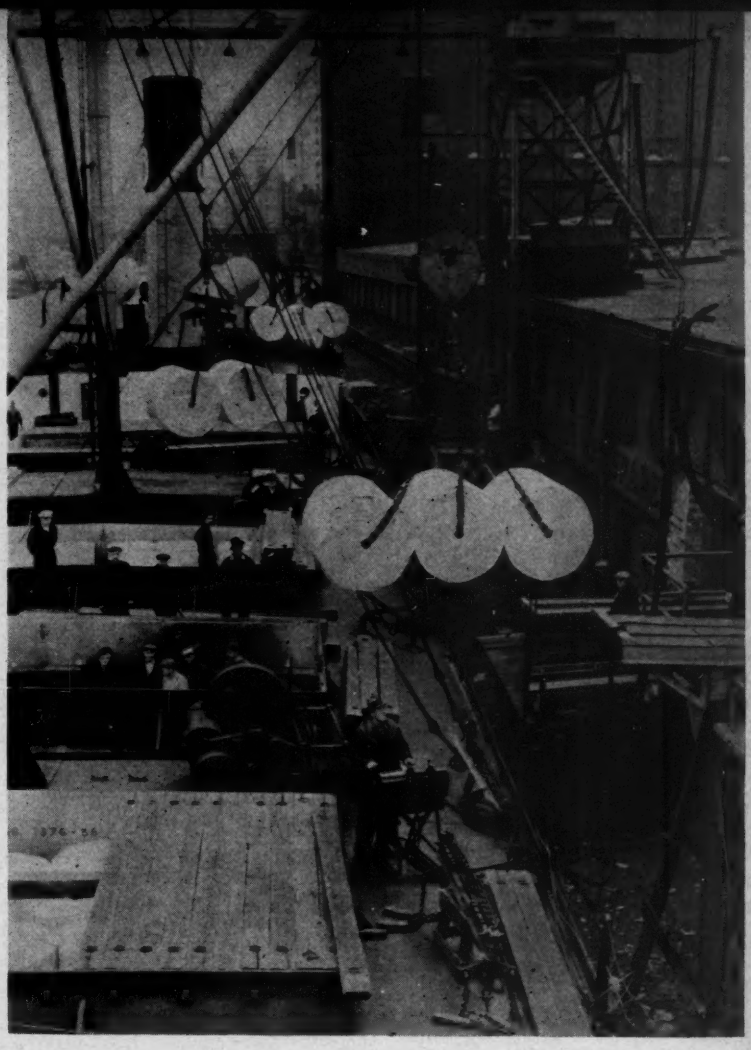
Bringing newsprint to the presses can be quite an adventure in material handling.

By F. J. BYINGTON, JR.
Assistant Business Manager,
The Chicago Tribune

load the fore and aft holds simultaneously. These cranes were especially adapted for the unloading of newsprint. In view of the limited navigational season, it was essential that turnaround time be reduced to an absolute minimum. Today, after about eight years of continuous operation, a boat is usually unloaded in eight hours.

Another feature of the cranes is the portable control, operated on the boat deck near a hold, which is shown in one of the photos. This flexibility gives the crane operator maximum visibility into the hold of the ship during unloading, thus contributing to the safety of the operation. Additional data on the cranes are given in the "Mechanically Speaking" section near the end of this article.

The cranes deposit the rolls of newsprint on inclined ramps—and at the ends of these the miniature railroad enters the picture.



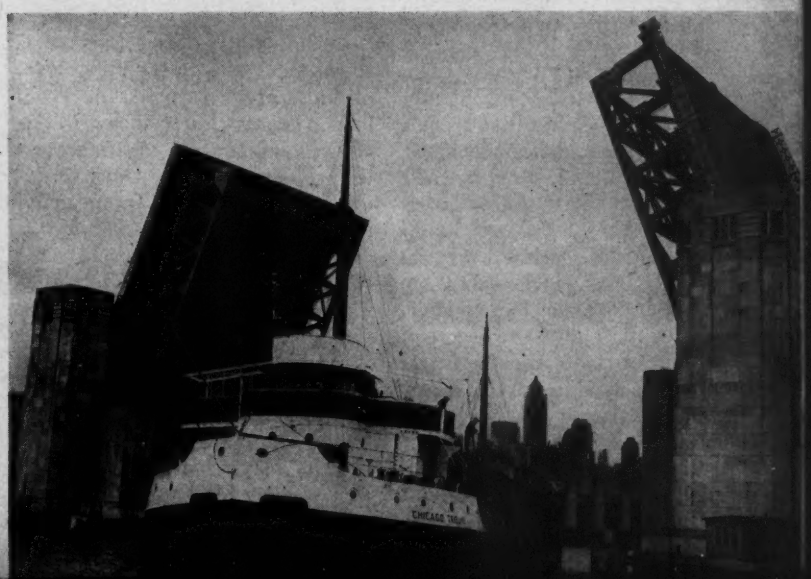
Hammer head cranes, opposite page, make possible short turnaround time. In unloading operation, right, note portable control on deck.

ABOUT IT!

Gravity Is the Locomotive

As each roll is disengaged from the spreaders, it is eased by the stevedores onto a 4-wheel dolly. The latter then transports the paper by gravity to the stockpile in any of the five warehouses that are connected by 5,000 feet of 12-inch gauge track. On the steeper grades the simplest kind of retarder slows the traveling carriers—planks inserted at one end between the metal ties. The raised free ends of these retarders are in effect "spring boards" that press against the underside of the dollies. At certain sharp turns the braking pressure is sometimes applied by means of a lever installed beside the track.

At the stockpile, a block of wood placed across the track is sufficient to bring the slowed-down dolly to a complete stop. Here, on a narrow platform running parallel to the track, a bench on the same



Boat with trunk deck has increased capacity.

level with the top of the dolly has been positioned. And the narrow aisle space between this platform and the stockpile is bridged by a tiering machine. The paper is simply rolled on the bench, a small platform, and then on the platform of the tiering machine. The latter elevates the rolls—weighing from 800 to about 2,000 pounds each—to the desired level, where they are moved away by the stowing gang. Dunnage strips of planking separate each horizontal layer of rolls, and as a safety measure the first four or five rolls in each layer (nearest the aisle) are individually blocked. The paper is stacked to a height of 20 feet, leaving no headroom wasted.

Dollies travel fast with loads to stockpiles, right, while empties return on lower track.

Nine portable, electrically operated tiering machines are used throughout the warehouses, including several high and lower models. The lower ones are moved from one building to another, for their shorter height permits them to be transported conveniently through door openings that are not very high. The higher machines, on the other hand, stay in their particular buildings. This saves dismantling them.

Both types of machines may be coordinated in a single operation. While a larger type, for example, is used for tiering the top layers of a stockpile, a lower machine is frequently employed in starting a new stockpile alongside the one being completed.

A slight push starts the empty dollies back to the *foot* of one of the two inclined ramps, whose upper level is either six or 10 feet above the lower track on which the empty dolly returned. How is the carrier brought to the upper level? This is accomplished by means of an automatic elevator installed at each ramp. As the individual dolly runs on the elevator, an automatic stopper holds back the train of empty carriers behind it.

The elevation of the east ramp is 10 feet, of the west ramp, six feet. The difference is explained by the fact that the floor level of the west building is at a lower level than that of the east building. Sufficient grade is thus provided to operate practically the entire system, both outgoing and returning lines, by gravity. The line of travel from the boat unloading ramps is east and west, with automatic switching connecting north-south spurs.

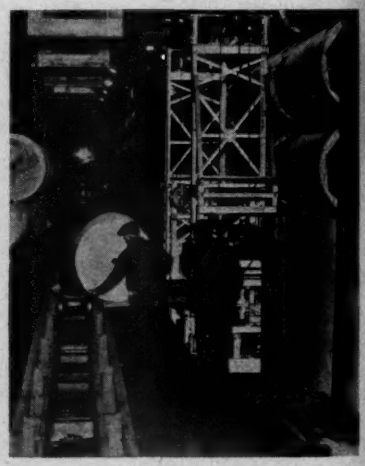
Usually the loaded dollies travel to the stockpiles on the upper level of track and return on the lower level. This is clearly shown in one of the photographs. As indicated, the transfer from one track to another is accomplished by means of automatic switches. Suppose a dolly has reached the end of a straight section of track terminating at a wall. Here it will pass through an automatic switch, hit a rubber-cushioned bumper, and then pass back through the switch on the parallel track. Or, depending on the particular location, the switch may route the carrier around a curve to an outside track connecting with another building, or it may continue through an adjoining building. Thus, with speed and practically without mechanical aid, both the loaded and unloaded dollies are routed over the system—on straight lines, curved sections, or from one parallel track to another.

It has been mentioned that "practically" the entire system operates by gravity. The only exceptions are two fairly short powered units operating dogs that connect to the undersides of the dollies. One such booster is installed between two buildings with a difference of about four feet in their floor levels. Two other power units, installed on two parallel sections of track, are at the head of the spur connecting with the Chicago tunnel system.

Going to Press

This brings us to the operation that supplies the press room—about 1,000 feet distant from the warehouse. As indicated in the previous paragraphs, a spur of the warehouse railroad connects with the Chicago Tunnel Company's system—an electric underground railroad that distributes freight within Chicago's downtown district. A spur of the tunnel system also enters the Tribune's sub-basement.

The transporting of the paper to the press room is done on an eight-hour shift at night, when the Tribune leases the right of way from the Tunnel Company. (The laying of a third track in the tun-

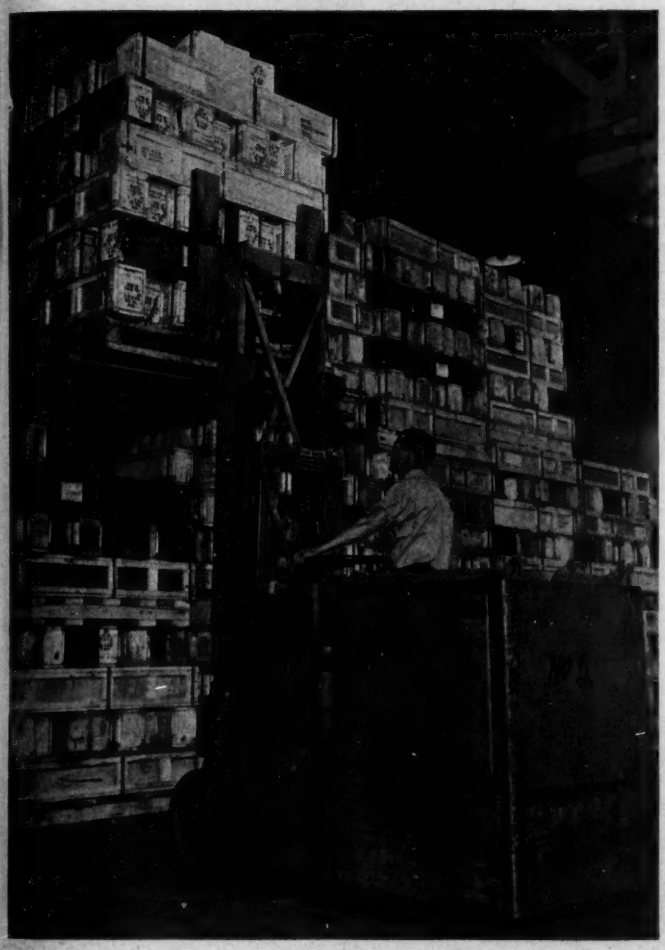


Transfer to tiering machine. Not shown is platform along track and bench in use today.

BATTERY TRUCKS need less attention

...ALKALINE BATTERIES

give most trouble-free power



Tiering of materials to the ceiling permits maximum utilization of storage space. This is a stop-and-go handling job in which battery trucks excel because of their inherent flexibility and dependable operation.

THE performance of American industry during the war furnished convincing evidence of the superior dependability and high availability of battery-powered material handling trucks. They stayed on the job 24 hours a day—day in and day out—with an amazing regularity that many users thought was impossible until they saw it demonstrated. Here's why:

The electric drives in a battery truck are inherently simple, have few moving parts to require repair and replacement, and are free from wear-and-tear vibration. Exchange batteries keep the truck continuously supplied with power, so except for a few minutes to change batteries two or three times per 24-hour period, the truck need not stop working for servicing of its power unit.

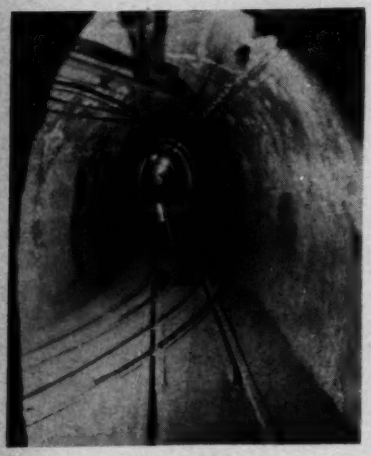
Besides requiring less attention, the battery truck is also economical to operate. It uses power most efficiently because it starts instantly, accelerates rapidly, and consumes no power during stops. The current used for charging its battery is the lowest-cost power available.

Because of these inherent advantages, the battery truck is therefore a most dependable and efficient material handling unit . . . especially when powered by Edison Alkaline Batteries. With steel cell construction, a solution that is a preservative of steel, and a foolproof electrochemical principle of operation, they are the longest-lived, most durable and most trouble-free of all industrial truck batteries. Edison Storage Battery Division of Thomas A. Edison, Incorporated, West Orange, N. J. In Canada: International Equipment Co. Ltd., Montreal and Toronto.

Edison
ALKALINE BATTERIES

nel provided the required track width for the dollies.)

The transfer of the rolls *from* the



Tunnel view: newsprint travels at 35 miles p. h.

stockpiles to the dollies is just as smooth and fast an operation as putting the arriving newsprint into the warehouse. When the individual roll has been placed on the tiering machine platform, it is swiftly lowered to the level of the bench, then rolled onto the waiting carrier. This operation is done so speedily that a roll of newsprint is usually ready by the time the next empty dolly arrives. A push then starts the loaded dolly on its way to its destination at the entrance of the connecting tunnel, being slowed where necessary.

The "tunnel dollies," it should be pointed out, have eight wheels and are of heavier construction than the four-wheel type used for transporting the rolls in the warehouse. Both types are of heavy cast iron construction. While the smaller dollies are about 30" long, the larger ones measure 60", with a deeper cavity in which the heavy rolls of newsprint rest securely.

The heavier dolly is necessary in view of the steep incline leading from the warehouse level to the tunnel. Since the drop is about 50 feet, the loaded dollies are lowered gradually by means of the dogs operating on the powered unit installed between the outbound track. At a certain safe point the dog drops down, and with a roar the released dolly shoots down the rest of the incline, developing a speed of about 35 miles per hour on its way to the sub-basement of the press room. A mechanical retarder slows the carrier shortly before it arrives at its destination. Then a manually operated retarder brings it almost to a complete stop.

The final part of the track is a tilting section, operated automatically by compressed air (see photo). The loaded dolly comes to a complete stop on this section and hits a button, which in turn activates the tilting section that automatically rolls the paper off on an inclined platform. Automatically again, a compressed-air ejector then pushes the empty dolly through an open switch, against an automatically operating ram. The latter is activated by the contact and gives the dolly a push that sends it back through the tunnel. As it approaches the connecting line at the other end, it is engaged by a dog on the booster section that is installed on the return line, and so returned to the upper level. In the warehouse, the dolly is routed to an overhead section from where it again moves by gravity to the loading point.

As the newsprint is rolled onto the inclined ramp at the endpoint, the individual rolls are fed automatically onto a tray lift (see photo) which delivers the paper at a predetermined rate to the reel room. (The rate of speed of the tray lift is set in accordance with the speed with which the rolls arrive from the warehouse. This speed is, of course, determined by

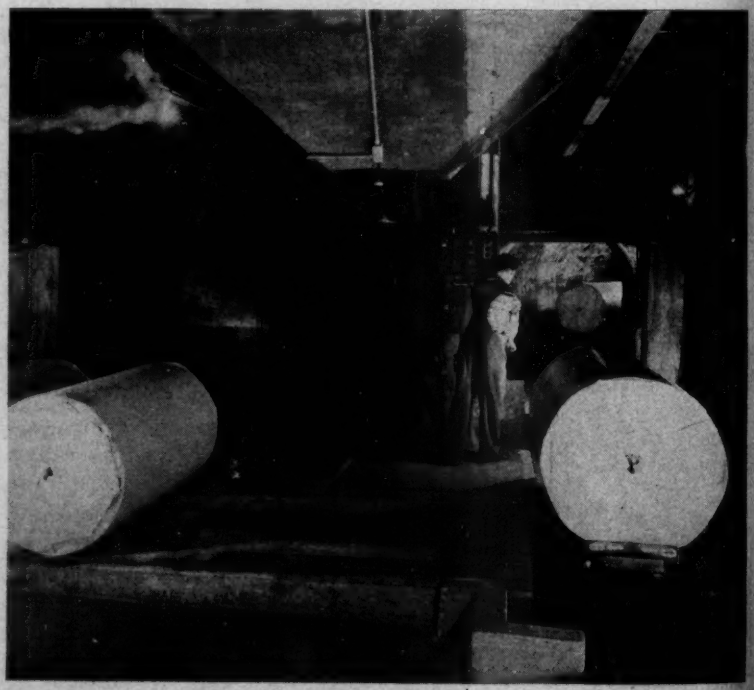
Tray lift then carries rolls to reel room floor.

the frequency with which the rolls are lowered into the tunnel.) From the reels, the paper is fed into the presses on the floor above.

(Note: This track system was designed and installed under the direction of Fred von der Horst, Receiving and Warehouse Supt.)

The present method has been in operation for about 15 years. Prior to that time, over-the-road trucks were used for transporting the newsprint from the warehouse to the unloading dock of the press room. This was a cumbersome operation that involved much extra

(Turn to page 47)



Tilting section, right, automatically rolls of newsprint rolls on inclined platform.

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"INDIRECT LABOR COSTS"-

A problem for the

• SMALL— • MEDIUM— • LARGE

Here are suggested approaches to the problem, with actual figures from the U. S. Navy's experience.

ALL plants, whether big or little, have to handle material, even when their products occupy a minimum of space and the weight of the material may be negligible. Cuff links, razor blades and many pharmaceutical products are light and take little space, yet they involve many handling problems both in processing and shipping. In this article, however, we are concerned with products which consume cube, or involve weight, and which require greater effort to handle in manufacturing.

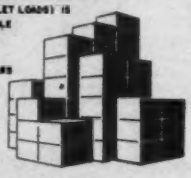
A Sadly Neglected Item

In many lines of endeavor every fraction of a cent has been milked out of the actual processing cost, and studies have been largely confined to direct labor and material savings. But indirect labor costs have been sadly neglected. These indirect labor costs result from handling and storing incoming materials, serving manufacturing floors and moving between operations; and the handling, storing and shipping of finished products. Many profit dollars have been lost — literally — because management has not had a realization of these indirect costs through segregation and analysis—and then done something about it!

Astounding facts about undreamed-of output were revealed during the war years—extra output that resulted from relieving operators of all work except actual operation of their particular ma-

LETIZED UNIT LOADS vs LOOSE CARGO

THE FOLLOWING CHART COMPARES TWO CARGO HANDLING METHODS AT EACH OPERATION IN A TYPICAL SHIPMENT OF SUPPLIES FROM NAVY CONTRACTOR TO POINT OF USE. THE NUMBER OF MAN-HOURS REQUIRED TO HANDLE 100 TONS OF PALLETIZED CARGO (77 PALLET LOADS) IS COMPARED WITH THE NUMBER OF HOURS REQUIRED TO HANDLE THE SAME AMOUNT OF LOOSE CARGO (4060 SEPARATE PACKAGES). THE FIGURES USED ARE BASED ON TIME STUDIES CONDUCTED BY MATERIALS HANDLING OFFICERS IN THE UNITED STATES, GUAM, PEARL HARBOR AND TRINIDAD. IDEAL WORKING CONDITIONS ARE ASSUMED.



• 10 MAN-HOURS

OPERATION	PALLETIZED	LOOSE CARGO
PALLET AT CONTRACTOR'S	15 MAN-HOURS	NO MAN-HOURS
PALLET AT CONTRACTOR'S	35 MAN-HOURS	NO MAN-HOURS
CAR AT CONTRACTOR'S	8 MAN-HOURS	80 MAN-HOURS
CAR AT SUPPLY DEPOT	9 MAN-HOURS	24 MAN-HOURS
AT SUPPLY DEPOT	9 MAN-HOURS	30 MAN-HOURS
AT SUPPLY DEPOT	6 MAN-HOURS	30 MAN-HOURS
CAR AT SUPPLY DEPOT	8 MAN-HOURS	80 MAN-HOURS

OPERATION	PALLETIZED	LOOSE CARGO
UNLOADING CAR AT SHIPSIDE	9 MAN-HOURS	24 MAN-HOURS
LOADING AND STOWING ON SHIP	37 MAN-HOURS	47 MAN-HOURS
UNLOADING SHIP TO DOCK	24 MAN-HOURS	184 MAN-HOURS
LOADING TRUCK AT DOCK	9 MAN-HOURS	54 MAN-HOURS
UNLOADING TRUCK AT SUPPLY DUMP	9 MAN-HOURS	57 MAN-HOURS
STOWING AT SUPPLY DUMP	9 MAN-HOURS	30 MAN-HOURS
RELOADING AT SUPPLY DUMP	6 MAN-HOURS	60 MAN-HOURS
UNLOADING AT POINT OF USE	9 MAN-HOURS	30 MAN-HOURS

TOTAL NUMBER OF MAN-HOURS REQUIRED FOR MATERIALS HANDLING AT ALL OPERA

PALLETIZED CARGO . . 203 MAN-HOURS

LOOSE CARGO . . . . . 682 MAN-HOURS

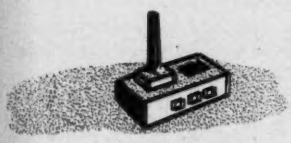
NET SAVING EFFECTED BY PALLETIZED UNIT LOADS . . . 682 - 203 = 479 MAN-H

A Plus Value . . . PALLETIZATION GREATLY REDUCES PILFERAGE POTENTIAL AND DAMAGE TO

NAVY DEPARTMENT, BUREAU OF SUPPLIES AND ACCOUNTS,

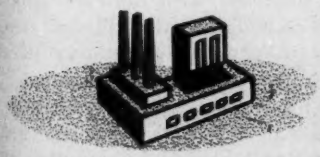
chines. Since a majority of products are sold on a highly competitive basis, the producer is in a

position to gain a distinct advantage by making certain that his handling of materials be mechanized according to modern methods. The producer's influence should begin with the supplier's shipping room and extend through every branch of distribution. Such a producer not only can offer prices to obtain the business, but he can



ship in a modern manner and thus realize greater profits. He is less affected by high costs for unskilled labor and his working force is more content. The reason is of course that the arduous, back-breaking jobs have been minimized. Also, his losses due to damage, pilferage and machine down-time can be reduced considerably.

Just how can all this be brought about? Let us treat each type of plant—the small one, the medium-sized one and the large company with far-flung plants—separately. Even though they may have the same basic problems (varying only

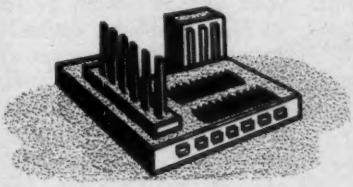


in complexity and scope), they do require different treatment.

The Small Concern

In the small plant the superintendent or the general foreman should be the instigator, drawing on the ready and willing services of a duly accredited industrial material handling equipment field representative in his vicinity. A continual review of trade papers will also prove profitable. This will not only help give the superintendent available, the job is only half done. The equipment must be correctly a general knowledge of suitable equipment, but will also save time by assuring that he will approach the problems correctly.

After the method has been selected and the equipment made



applied and properly balanced with labor. Care of equipment with regular inspection and a preventive maintenance program is equally important. For when the use of the equipment is integrated in the flow of materials, down-time for repairs can prove very costly.

The Medium Operation

If you are concerned with what might be termed a medium-size operation (even though a thousand or more employees are engaged), you definitely should have a ma-

Step up production—
MOVE MATERIAL **FASTER**
CON-VAY-IT IT'S ELECTRICAL

For moving ashes, cinders, grain, seed, sand, gravel, metal parts, aggregate, brick, clay, sawdust, chemicals coal . . . all sizes.

Save countless man-hours by using this handy, husky portable belt conveyor. Simply plug into any wall outlet and CON-VAY-IT goes to work—clean, fast. Well engineered, ruggedly built to give long, low cost service. Four models: two belt widths—8 to 12 inch; two lengths—13 and 20 feet. For lifts too steep for a belt, use FLIGHT-VEYOR—four sizes to meet varying needs.

Distributors in principal cities of the United States and Canada

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Please send bulletins on CON-VAY-IT and FLIGHT-VEYOR.

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• Are your production control records convenient to use and post? Do you have to refer to several different files for vital information on one subject? If you do, POSTINDEX Visible Files will make your work easier, simpler and more efficient.

POSTINDEX Records consolidate on one 4-page form all the important information on a certain part or operation. All four pages of the form are equally accessible. The forms are suspended on spring steel wires which permit them to be *flipped* backward and forward instantly. There is nothing to wear out. The forms are housed in Drawer Cabinets, Rapid-Stacks or Flat-Books—whichever type of unit you prefer.

A new POSTINDEX booklet "Fast, Accurate Production Control" has just been prepared for you. It illustrates and describes a number of POSTINDEX production department forms now being used by various leading industries. In addition, it describes the use and operation of POSTINDEX Visible Files in detail. It's FREE and we'll be glad to send you a copy on request. Address Postindex Company, Dept. F., Jamestown, N. Y.

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terial handling engineer or specialist. His responsibility should be the constant planning, supervising and improving of all handling operations, including storage practices, incoming packing and carloading methods, outgoing techniques, etc. His recommendations should be given full consideration in connection with all changes of floor layouts from their inception, as well as building alterations and new construction. In many instances modification of appurtenances, repair of pavement, etc., will mean the difference between success and failure of an otherwise well-planned operation.

Depending upon needs, the engineer's sole responsibility may be material handling in all its phases; or he may be involved in general industrial engineering, methods and time study and material control (sometimes called "production" when a distinction is made from actual manufacturing).

Depending upon the number of departments concerned with the handling and storing of material, it may prove more effective to have an individual with at least part-time responsibility for material handling functions in each. In this case he would report indirectly to the engineer for these functions.

If there is any similarity of work in the different departments, or coordination is required between them, it would be well to have periodic, brief, well-planned meetings. Their purpose would be to work out joint problems, disseminate information, inspire progress and follow through on all projects.

The appointment of such a person raises a situation that must be reckoned with before embarking on a streamlined handling program. Be very careful in selecting your man for this important task and see that he gets the necessary support. The very nature of the job calls for ingenuity, imagination, aggressiveness, versatility and diplomacy—particularly the latter. This because, in most instances, he is functioning as a dual authority with the operating head of the department.

Of course, the engineer should utilize all possible outside sources, such as equipment field representatives, material handling associations and publications. These sources will be helpful in keeping him abreast of developments, selecting the proper equipment and instituting refinements in operation.

A general education program is always helpful in making any new program effective. Operators of new equipment should be properly trained in performing each operation. This applies particularly to mobile equipment. Longer life, less accidents and greater output will result. It is a good idea to assemble the foremen, truck operators and material handlers periodically. On such occasions they should be shown visual aids to acquaint them with what other companies are doing. This will help enlist their interest. Equipment manufacturers and the Armed Services have splendid motion pictures which may be borrowed for such occasions.

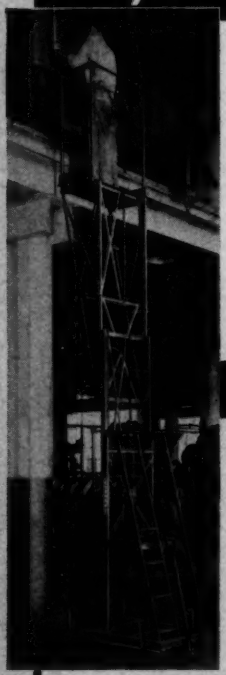
Large Companies

In organizing an effective program for large companies, with many plants and a wide variety of products in each plant, the setup should be similar to that of the medium-size company. However, the large organization will also require a General Material Handling Committee. The specific reasons for this are: 1. The need for standardization of types of equipment and practices, particularly where an appreciable volume of inter-plant movement of material occurs. 2. The desirability of an over-all central equipment control. 3. The repeated occurrence of similar problems with different products or under slightly different conditions, and the essentiality of a well-coordinated effort.

This committee should be composed of the engineer from each plant and headed by an over-all advisor and a coordinator. The coordinator should, if possible, be on the staff of the company's president, or at least a part of the general management, so that the backing won't be lacking to overcome some old-school thinking. The companies that failed to accomplish desired results prior to the war can lay it to the fact that they did not place the committee on a high enough plane and treat it in line with its importance. Material handling is one of those activities

(Turn to page 63)

Easy to Reach High Spots Safely



MODEL PUL

Hi-Reach Platform Telescoper

Designed for safety in maintenance of lighting fixtures, ceilings, skylights, overhead cranes, etc. Hand operated. Ladder steps to platform when elevated. Equipped with floor lock. All models have minimum height clearance, when down, of 6 ft. 8 in.

No. 1, Platform lift 10 ft. 9 in.....$255.00
No. 2, Platform lift 11 ft. 9 in..... 260.00
No. 3, Platform lift 15 ft. 0 in..... 285.00

Full freight allowed. Larger Hi-Reach Telescopers up to 60 ft. lift available.

Save production time with a

SHOPLIFTER

One man can handle heavy dies up to 500 lbs. alone. Easily moved about. Also handy for loading and unloading trucks and miscellaneous lifting jobs. Platform 24 in. x 24 in. Lift of platform 4 ft. 6 in. Price $147.50 (foot operated floor lock optional, $10.00 extra). Prompt delivery — Heavier capacities available.

ECONOMY ENGINEERING CO.
2677 WEST VAN BUREN STREET, CHICAGO 12, ILLINOIS

HOW A B-G BUCKET LOADER KEEPS YOUR TRUCKS *Rolling*

● Cut down their idle time. Keep trucks moving in rapid rotation with a fast feeding Barber-Greene Bucket Loader.

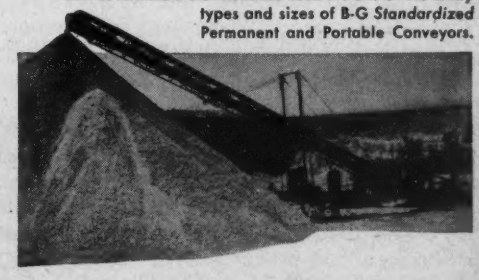
There is no cheaper way to load bulk materials . . . no better way to hold labor costs down.

No time lost getting into position. With its crawler mounting, you can get over soft spots, maneuver in cramped corners easily.

Cutting action across the full width of the feeding spirals keeps the buckets full. Material is delivered at top capacity from stockpiles, natural deposits and during light excavating or soil stripping. You have twelve crowding speeds to cope with any loading condition.

There are a score of other advanced mechanical features in the B-G Bucket Loader that will help you save money on every material handling job. Write for free literature. Barber-Greene Company, Aurora, Illinois.

Ideal for stockpiling and reclaiming, this B-G Portable Conveyor handles large volumes with little horsepower and at minimum maintenance cost. It's one of the many types and sizes of B-G *Standardized* Permanent and Portable Conveyors.



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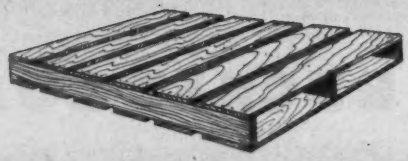
Barber-Greene B G *Constant Flow Equipment*

ON THE  PALLET

NEWS · VIEWS · TRENDS

THE new industrial science of materials handling will increase production because it will eliminate bottlenecks and speed up production by the orderly and efficient flow of material through manufacturing plants. It will reduce capital investment by allowing more tons to be stored or handled by unit of space.

"I would like to suggest that this organization be eventually a national professional organization. I believe that your national organization should be departmentalized, and broken down into such divisions as Industry and Manufacturing—Land Transportation—Stevedoring, and Warehousing. You may care to make one other sub-division, and include a department on packaging, for the two go hand in hand; one is definitely dependent upon the other. No matter how good a package may be, it can be damaged by poor handling; and conversely, good handling methods will allow cheaper packages to be carried through to their destination in a satisfactory manner.". . . From a paper by Commander B. R. Lewis before Materials Handling Society of Pittsburgh.

SCHEDULED to be completed in April, a production coal handling system for the Parisian area is now being built in this country. It will ultimately handle 500 tons per hour. The equipment consists of a 249-foot main belt conveyor, four other belt conveyors totalling 311 feet long, and dust-sealed trippers. This material is being built by Robins Conveyors, Inc., through an order placed by the French Supply Council.

THE Joy Manufacturing Company has announced the acquisition of the La-Del Conveyor & Manufacturing Company of New Philadelphia, Ohio. Ivor Harris, president of the Ohio company, is retiring shortly from active business, and A. L. Schwab, formerly La-Del's general manager, will become the chief executive of this new division upon Mr. Harris' retirement.

"ONE of the strangest results of technological advance came in the auto industry. Labor-saving devices cut down employment but other mechanisms were introduced which complicated car making and called for additional labor. One apparently offset the other for man-hour productivity in 1938 was virtually what it was in 1929.". . . The Twentieth Century Fund.

A LEGION OF MERIT was awarded recently to Lt. Col. H. A. Stevenson, General Staff Corps, Army Service Forces, for . . . "meritorious conduct in the performance of outstanding services in the Storage Division, Office of the Director of Supply, Army Service Forces." The citation says further . . . "he made a notable contribution to maintaining the flow of supplies during a crucial period of the war . . . and his untiring resourcefulness was directed constantly to the task of correcting the storage and materials handling operations of the Army." Col. Stevenson has returned to his former business as a distributor of industrial trucks in the Michigan territory, but the significance of the Legion of Merit Award cannot be overlooked in view of the Army problems during the course of his Army service.

"WITH material and labor costs rising steadily, American manufacturers' greatest hope for keeping on a sound competitive basis lies in their ability to reduce overhead through efficient plant layout and material handling. . . ." R. W. Mallick, Westinghouse Electric Corporation, at American Management Association meeting.

"UNQUESTIONABLY the first and most completely basic requirement for successful national and international revision of former costly transportation procedure is the coming use of unit containers. These would carry freight without breaking bulk between any points on the globe, reducing the transfer costs at carrier-interchange points in excess of 80% of the present cost. These containers made of the lighter metals, will carry up to twenty tons, with a tare weight of only 10% of the whole. They will be packed at the benches of the factories with little or no crating or dunnage and will move thence over highways, waterways, rail and air routes direct to their consignee's work tables.

"Once containers are standardized, suitable ships, boats, barges, planes, trucks, trailers, half-tracks, and flat-cars will carry them into fields of commerce never before accessible.

"Coordination between the four media of operation, i.e., air, water, rails, and highways; elimination of duplication and inter-system competition; the close gearing of the national systems to an international whole, all will have a marked influence upon the new transportation systems. Better coordination, and disappearing interchange costs, will weld together a more efficient international transportation system than the patchwork of today, which does not merit the title of 'system.' ". . . John H. Bernhard.

ACCORDING to recent announcements, the General Electric Company is about to start production on a motion picture, entitled "More Power For America," which will deal with material handling.

Acme Uni-Pak

TOMORROW'S PACKAGE *Today!*

Skidloading, palletizing or bundling make possible *the shipping and handling* of a group of packages, semi-finished parts or finished products in one unit—Acme Uni-Pak—a method pioneered by Doc Steelstrap. The result is lower handling costs for you and your customers. Perhaps you, too, can save money with Acme Uni-Pak.

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MATERIALS Flow FASTER!

WHEN PULLED OR PUSHED BY

SHOP MULES

POWERED BY INTERNATIONAL HARVESTER

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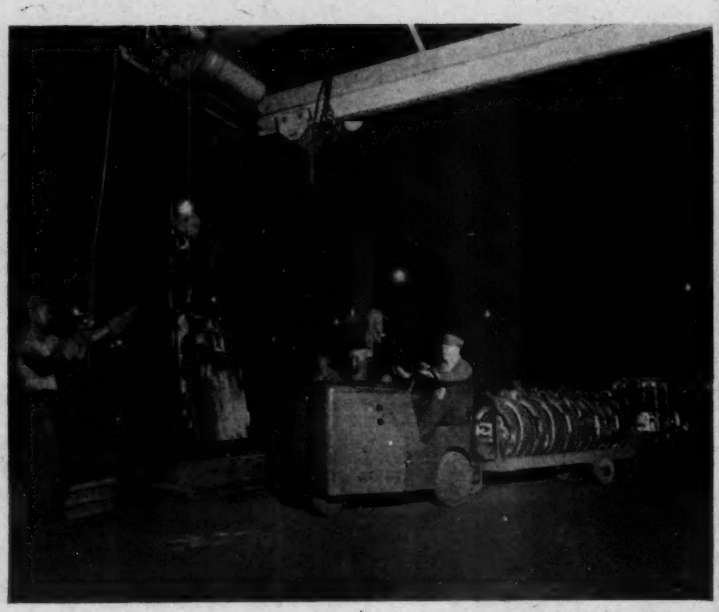
HEBARD

SHOP MULE INDUSTRIAL TRACTORS



A3 VICTORY SHOP MULE

J233 OXY-ELECTRIC WELDER

SHOP MULES SPEED the flow of materials to processing points and the movement of finished product to shipping docks or storage points. These sleek, nimble, powerful tractors tow trailer trains through narrow aisles and congested areas with the agility of an eel. They lighten the load for your men. Machines work continuously . . . no delays waiting for materials . . . no stoppage for removal of finished work. Snow plows, rotary sweeper brooms, winches, electric arc and oxy-acetylene welders attachments greatly increase utility. Many models, to meet various working conditions. WRITE for catalog! Sales parts and service through International Harvester Industrial Power Distributors *everywhere!*

All Hebard SHOP MULES are Underwriters Laboratories Approved

W. F. HEBARD & CO., 2433 S. STATE ST. CHICAGO 16, ILL.

CREATORS AND MANUFACTURERS OF SHOP MULES SINCE 1918

Systematic Maintenance for Tireless Workers

By VICTOR J. PAUL
Internal Transportation Department
Goodyear Tire and Rubber Co., Akron, O.

Industrial trucks are tireless workers, serving production, warehousing, storage and shipping. When this equipment is kept operating 24 hours a day, six days a week, maintenance looms as a particularly important function. A truck that is kept waiting until repairs can be made is not only a non-productive piece of equipment, but its inactivity will hamper production and other necessary operations. Proper provisions for maintenance and repairs also spell "insurance" for your investment. This is true whether you have one truck or a 100.

OUR company operates a fleet of 138 industrial trucks, including 20 motorized hand trucks, that move millions of tons of material annually between receiving, storage, production and shipping in several plants located on grounds that cover more than 1,000 acres. To insure a smooth flow of material between the many departments and buildings, our company operates a completely equipped maintenance department and spare parts stock room.

The maintenance program stresses *prevention*. The systematic program provides an inspection for every powered truck once a week, as well as a thorough greasing job every 15-day period. This preventive phase is, of course, designed to anticipate breakdowns, to "catch" small defects before they become serious ones. And the repair shop is so staffed and equipped that the heaviest jobs are completed within 36 hours. A complete overhauling is usually done within 21 hours.

To this end, the department operates on a 24-hour basis, with a crew of 14 full-time repair men.

MATERIALS Flow FASTER!

WHEN PULLED OR PUSHED BY

SHOP MULES

POWERED BY INTERNATIONAL HARVESTER

★

HEBARD

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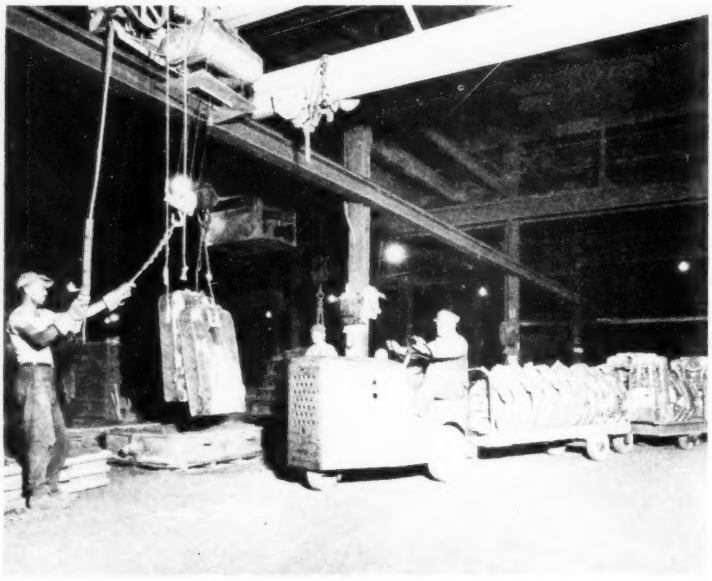

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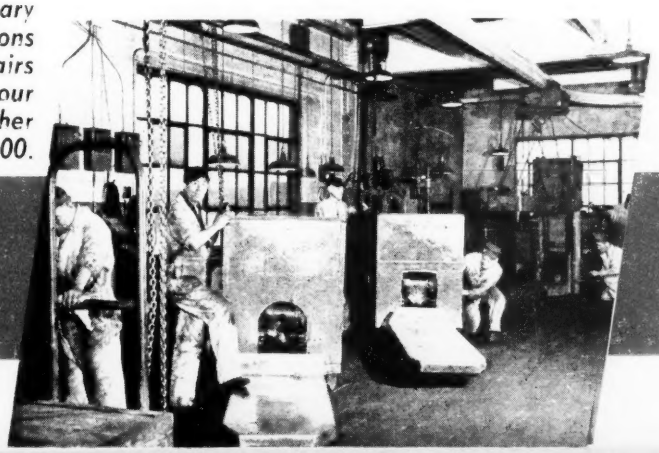
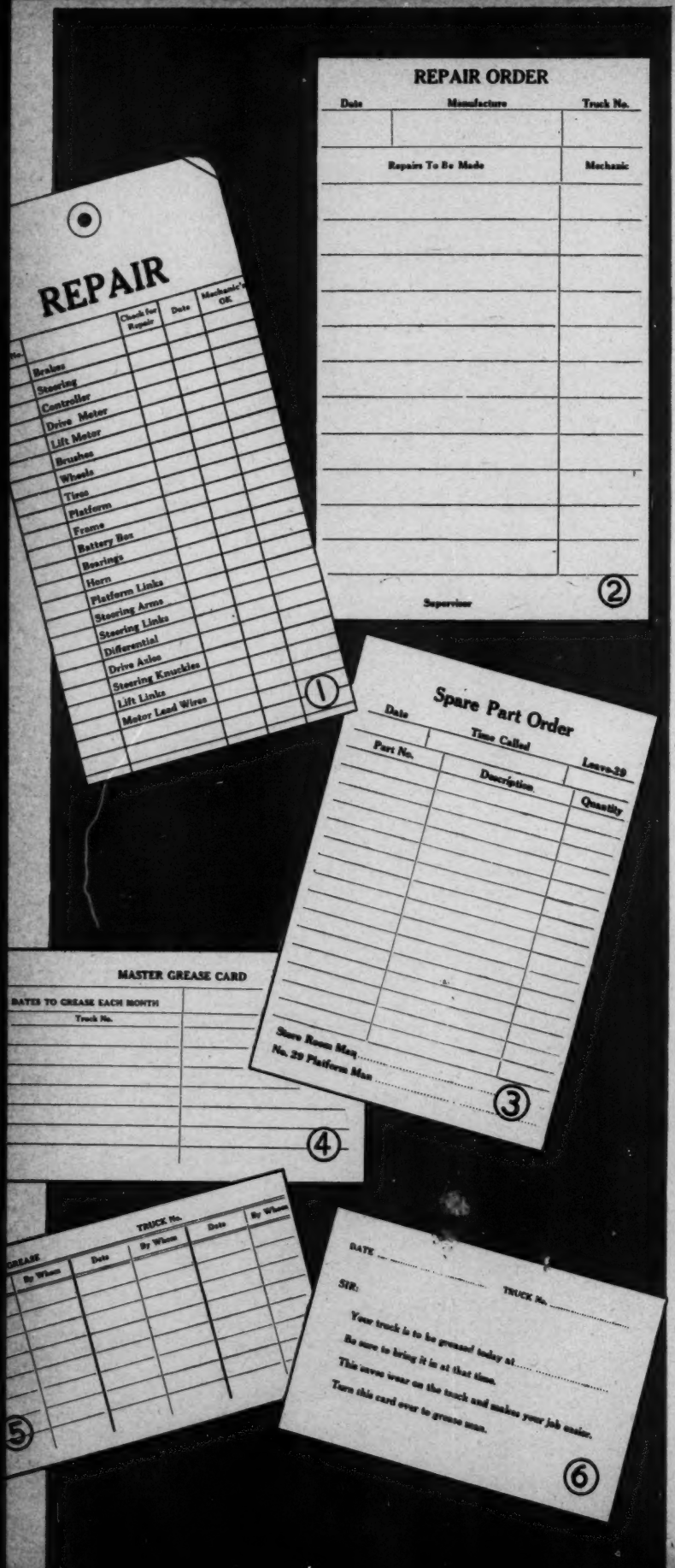


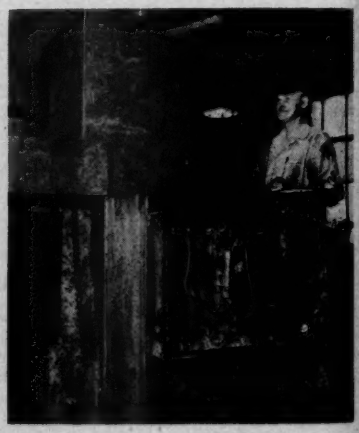
Top photo: Heavy parts are readily removed by hoists which cover full length of repair shop. Right: Over-all view of maintenance department, equipped for every type of job.



Ten of these are regular mechanics, with the remaining four making up a lubricating gang. Not included in these figures are two smaller repair shops, each located in a separate plant. These smaller operations, which attend to minor repairs, in their plants employ five additional mechanics and four lubricating operators. While the present description applies chiefly to the main repair shop, it also gives an insight into the system and controls that prevail generally.

Preventive Maintenance

If a defect is discovered during the regular weekly inspections, the supervisor makes out a Repair Order (1), which is handed to the mechanic who is assigned to the job. Observe that the main column of this form is headed "Repairs to be made." (See cut). This means that the supervisor notes the specific repair in each instance. Upon completion of the job, the supervisor checks it to make sure that *every item* listed (2), has been satisfactorily attended to. It is only upon approval by the supervisor that the repaired vehicle is checked out.



Forms used, left: No. 1 is repair tag made out by operator. No. 2 is repair order, No. 3 spare parts order. Nos. 4, 5, 6, greasing records, are fully explained in article. Photo, above, is of truck whose uprights have been rebuilt, fitting it for more years of service.

The time for the job is then charged to the particular truck. (Each vehicle is coded according to its make). In this way the rec-

ords show exactly the repair costs on each type of truck.

Of course, defects also occur before the regular weekly inspection

All rolling equipment is lubricated on schedule.

periods. To take care of such cases, we use another control form—a wired red repair tag. Every truck operator has these available to him every day. If he observes any irregularity while operating the truck, he makes a note of this on the tag.

This form, also reproduced here, lists 21 different repair or maintenance items. The driver merely checks the part needing attention. Two blank lines at the bottom of the form are for entering any item not covered in the printed list.

This red tag is attached to the truck when it is brought into the shop—and that vehicle cannot be used so long as the tag is on it. Usually the mechanic on the job takes the repaired truck for a test run before handing it over as "completed." Again, the repair job is checked by the supervisor, who is the only one authorized to remove the red tag.

Complete and Thorough Work

A word is in place about the scope of the repair work and the facilities provided. The shop is equipped with the men and the tools to do a complete job. The operators must be able to weld, do electric wiring and perform good mechanical work. This is necessary because we repair motors, armatures and do electric and acetelyne welding in addition to a host of mechanical jobs. When necessary, the shop rebuilds trucks in order to adapt them to special operations.

One rigidly observed rule is that a bad part must be *completely* replaced with a new one. Example: If one gear wears out in a differential, all its gears will be replaced with new ones.

All the tools are provided for doing a thorough job promptly. Flaring tools, a lathe, press, welding equipment, a drill press, and seven overhead hoists of two-ton capacity each are part of the shop's standard equipment. Six of the hoists are hand operated, one is electric. Upon occasion, a special tool may be made—a wheel puller, for example—to facilitate a particular operation.

Spare Parts on Hand

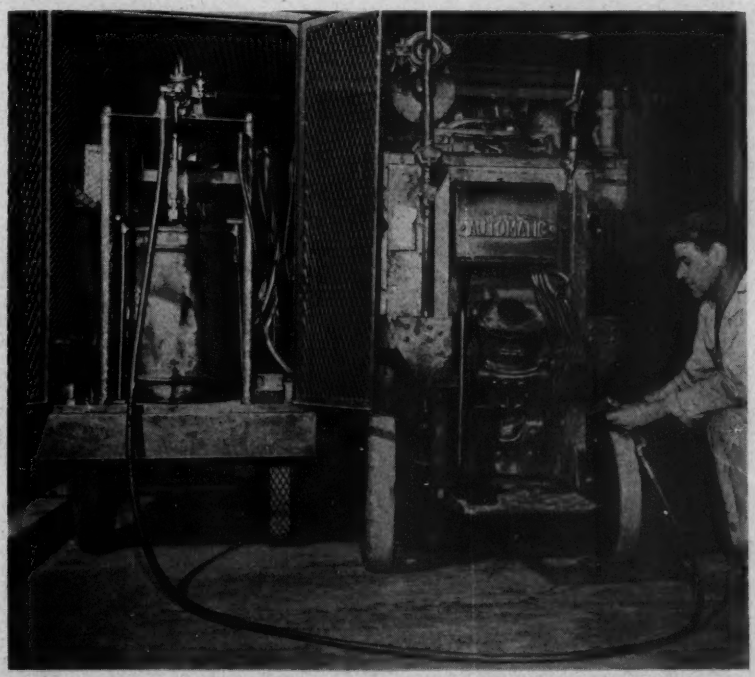
A full supply of spare parts is essential to an efficient maintenance department. Prompt repair work cannot be done when a job is held up pending the arrival of a part that had to be ordered. We carry approximately $30,000 worth of replacement parts in our stockroom.

Here is the requisitioning procedure. The mechanic making a repair lists on the spare-parts order (3) the part number, description and quantity of the item needed. This record is given to the stock-keeper who issues the part and makes the charge to the truck (again using the code number which designates the particular manufacturer). This charge enables us to obtain a complete figure on the maintenance cost of each type of equipment. The same spare parts form, incidentally, is also used by the two smaller repair shops. Note that this order specifies the time the part was requisitioned and the time it was delivered. There is also a space for the platform man's signature to show that he received it.

A perpetual "maximum-minimum" inventory of all parts is maintained, with a separate page in the inventory book devoted to each part. On the basis of past experience, for example, four pieces may be the maximum number of a certain item kept in reserve, two pieces the minimum. When minimum is reached and order is started for 2 pieces the parts supply is maintained at the proper level, aiding both the repair department and serving as a guide for purchases.

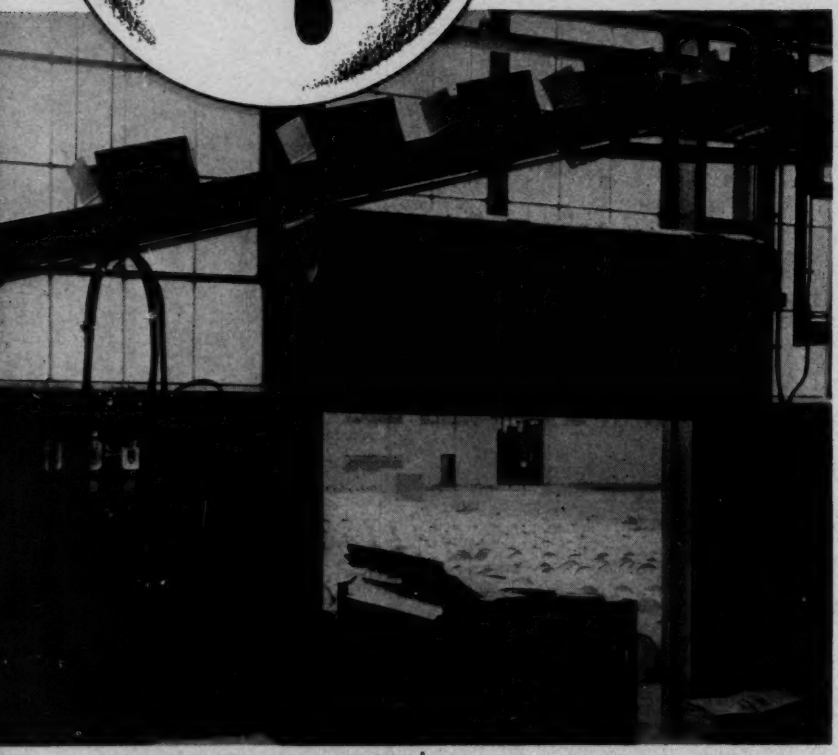
When parts are to be purchased, the stockroom clerk makes out a requisition and passes it along to the maintenance foreman. It is then handed to the writer for his approval, whereupon it is placed

(Turn to page 39)



This mobile lubrication unit saves time . . . an important part of preventative maintenance.

A half pint or a carload . . .



This overhead conveyor, top, brings case goods and 5-gal. pails to mezzaine floor in warehouse, where cases are sorted, sealed.

Below: Drums arrive on pallet-bearing tractor-trains; loads are then stacked by fork trucks. They may handle 7,000 tons a month.

It is evident that this operation coordinates a variety of handling equipment with outstanding success—belt, roller, drag-chain conveyors, fork lift trucks, tractor-trains, pallet-bearing trailers, and semi-live skids. By means of this smooth coordination, providing specific handling equipment for each type of operation, 10,000 different items are moved in large units with the shortest possible travel and with the least possible handling. Cases and pails arriving on the overhead conveyor from the factory are not touched until they land at the pick-off stations, ready for palletization. Waste motion and handling are similarly avoided in the movement of all the goods.

A DISTINGUISHING feature of the methods used at the warehouse of the Sherwin Williams Co.'s Chicago plant is the coordination between fork trucks and a variety of overhead and on-the-floor equipment. Some other features, equally noteworthy, will be mentioned in their proper places.

The main functions of the warehouse—approximately 700 ft. long and 300 ft. wide—are the classifying, storing and shipping of some 10,000 items. The chief products handled are paint, varnish and lacquer—in cartons and individual cans up to five gallons each. The larger drums (of 30 and 55-gallon capacity) are not handled by the overhead equipment mentioned. These arrive on pallet-bearing tractor-trains from the factory across the street via a specially constructed ramp. Fork trucks pick off the loads, two drums to a pallet, and tier them three high.

Neat Coordination

The bulk of the products con-

XUM

Whether it's a case-lot of half-pint containers or an order for a carload of 55-gal. drums—the Chicago warehouse of the Sherwin Williams Co. is equipped to handle any size order with dispatch and minimum effort. Specialized mechanical devices provide an exceptionally flexible operation for handling any of 10,000 products and sizes.

. . . COVERS THE PROBLEM

sists of case goods and smaller cans which are transported by live belt conveyor (through a tunnel) from the factory across the street. The belt discharges on an overhead powered roller conveyor, which delivers the material to a classifying or switching point on the mezzanine floor.

From this central station, the switchman routes the incoming cases and cans over any one of eight lines to a sealing machine. (The pail line of course by-passes the sealing operation.) The operator collects sufficient cases of one size on each feeder line—half pints, pints, quarts, etc.—so that the gluing machine can be operated with the fewest possible adjustments. Beyond the gluing machine, the lines converge and the sealed cases move over inclined gravity roller sections to the warehouse floor—to the three "pick-off" points shown in one of the photos.

Operators at these stations "pick off" the cases and cans and build them into unit loads on pallets, which have been placed on four-wheel trucks. As soon as a pallet load is completed, the truck is pushed to an adjoining free space. Fork trucks then pick off the pallets, move them to the assigned aisles and tier them three high. Thus the four-wheel hand trucks serve as movable platforms which keep the area around the palletizing stations free.

The storage area is divided into three main sections, in accordance with the types of orders handled. 1. Full pallet loads, including the large drums, for car lot shipments and for supplying the other order-picking operations. 2. Cases and 5-gallon pails for "select" orders, which will presently be explained. 3. Individual cans for broken-case orders.

Top: Switching station, upper photo, routes incoming cases to sealing machine. Beyond it (lower), lines converge, then dip to floor.

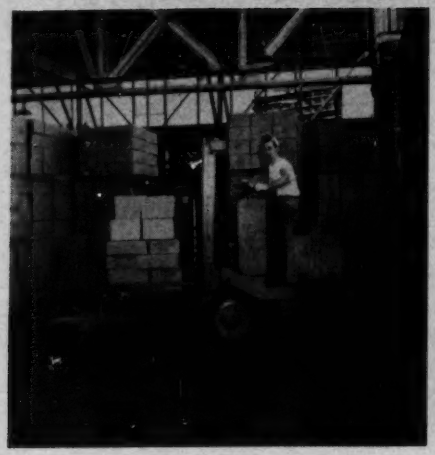
Solid pallet loads are hauled directly from the stock locations to the outbound cars or trucks either by fork truck or tractor-train, depending on the length of the haul. (Dock facilities within the building can accommodate eight freight cars and 20 over-the-road trucks.)

Drag-Chain Hauls Trucks

The warehouse handles a great many medium-size orders (for single cases). To fill these orders, a reserve stock "select line" is maintained in a number of aisles, which are indicated in the layout sketch.

Left: At take-off stations on warehouse floor pallet loads are prepared for fork truck handling. Monthly total of pieces is 230,000.

XUM



Flat trucks are made to serve as pallet dollies.

And loads are quickly moved and stacked by truck.

"Select line" in aisle covered by the drag chain.

This reserve stock is made up of smaller quantities, not solid tiers, of each of the items sold, and special racks are used for storing these single pallet loads. Thus a pallet load of half-pint goods, for example, can be placed within the rack, and another load (containing cans of a different size) on top of the rack. In this way storage for goods of different sizes is provided in the same tier, and each can be handled, into or out of storage, without disturbing the other.

The aisles in the select line area containing the most popular goods are covered by an overhead drag-chain conveyor which moves the four-wheel trucks with their completed orders to the loading stations. Since the items on the shipping tickets are listed according to the sequence of the stock locations, any backtracking is avoided. Aisles are simply by-passed when they do not contain goods needed for an order. From the case goods locations the trucks travel past the individual can storage area, then by the truck loading and car loading locations.

When the order is assembled on the truck, the operator writes the destination of the load on the direction panel—a metal shield affixed to the upper left-hand corner of the truck's pipe rack. This information includes the track and spot number, as well as the destination.

All the operator does to move the loaded truck to the shipping department is to insert the hook hanging from the truck's chain bridle to an eye passing by on the drag-chain. Since the chain bridle, attached to the truck's pipe rack, is 30 inches long, the hook is easily inserted or removed, and swaying of the truck is likewise avoided. At the various points in the shipping departments, the chalked lettering on the directional panels is easily read and the individual trucks readily disengaged in accordance with the instructions.

If an order is to be loaded into a car, the palletized load will be picked off by a fork truck and placed on a semi-live skid. The load is then hauled by means of a two-wheeled jack handle inside the car.

Broken-Case Lots

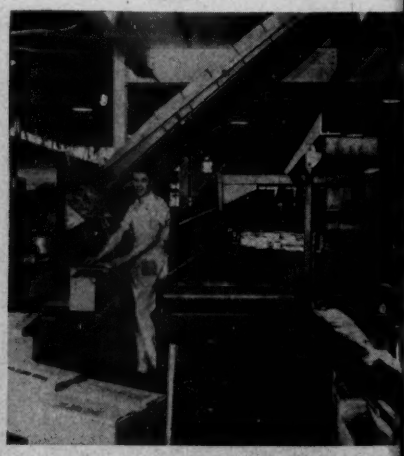
In this department, too, a well-planned layout and special handling devices are designed to move these orders with the least effort and the shortest possible travel. As a result, individual cans for these smaller orders are handled with the same dispatch as a solid freight car load of one item.

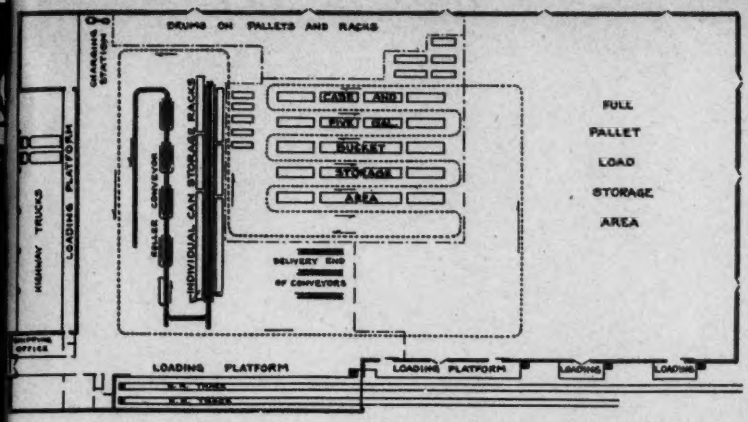
The individual cans for broken-lot orders are stored in metal bins arranged parallel to roller conveyor lines. Cans larger than one quart are stored in gravity roller feed bins, equipped with counter-

Drag chain moves considerable tonnage every day.

Racks, conveyor and carriers for broken-case lots.

Packing: Dowel pins shunt off carrier at station.





Floor plan of warehouse designed for unit load system and short man travel.

weighted tilting stops at the lower ends. The cans on these miniature gravity rollers stand upright, which is a space-saving feature.

One of the photos shows the arrangement of these bins in relation to the broken-case order conveyors.

Mechanically Speaking

A standard size pallet, developed for cartons and 5-gallon pails, measures 43" x 30". Since the drum pallets had to be built to accommodate two barrels each, these units measure 24" x 24".

The length of the overhead drag-chain conveyor is approximately 2,000 lineal feet. It is powered by a 25 h.p. motor which can be started only from the foreman's office on the mezzanine floor. As a safety measure, pull stops are arranged at intervals of 20 feet along the entire length of the installation, permitting any operator to stop the conveyor simply by a pull on a cord. Since the rate of travel is a moderate one, emergency stops of this kind are a rare exception.

In order to prevent damage to the floor, consisting of concrete reinforced with steel powder, all trucks, including the numerous 4-wheel trailer type, are rubber-tired.

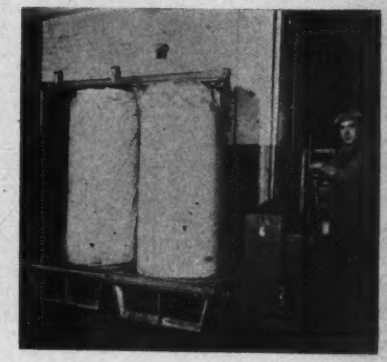
The orders are picked into trays—wooden carriers about two feet long which are pushed by the order clerks on one of two parallel conveyor lines. A third line, which is powered and installed between them, moves the completed orders out.

A word should be said about the order clerk's clip, which is fitted with a steel dowel at the top and bottom. During assembly of an order, these pins are inserted into holes arranged along the top edges of the trays. With the clip thus held firmly in position, the records are not "mussed up" among the cans. And the clerk has a rigid "table" for making his notations, assuring accuracy and neatness. At the same time both of his hands are kept free for handling the stock.

The holes in the trays are numbered and serve another useful purpose. Suppose an order has been assembled and that a particular tray is to be routed to Packing Station No. 5. The clerk will then insert steel dowels into the No. 5 holes (front and back) and push the tray over a transverse roller onto the powered line in the center.

As the traveling tray nears its destination, the projecting pins connect to an angle iron (actually, a switch installed above the tray), which in turn pulls the carrier off at the designated packing station. A photo shows a tray with the steel dowels connected to one of these "upper rails." The empty carriers are routed back over another line to the order picking stations.

TWO AT A TIME—Powered hand trucks are extensively used in production operations at the Goodyear Tire and Rubber Co. This one is shown moving two large rolls of calendered stock from storage to the cutting bias



machines. The truck readily picks and moves two skid loads at one time. The rolls weigh about 1,800 pounds each and the length of both platforms is 90 inches.—*Courtesy, Goodyear Tire and Rubber Co., Akron.*

Oildraulic Levelators conserve manpower, cut costs. Save plant space, too, by eliminating ramps and loading docks. Loads up to 50,000 pounds elevated directly from plant floor to trucks, freight cars, different building levels, or machines. Levelator rises quickly and smoothly as oil is forced into powerful hydraulic jack by simple electric pumping mechanism (or compressed air). Operation safe, dependable, economical. Installation simple.

Levelator car, when down, becomes part of floor and can be trucked over. Plant floor can be poured at grade instead of at railway or truck bed height—a real cost saving.

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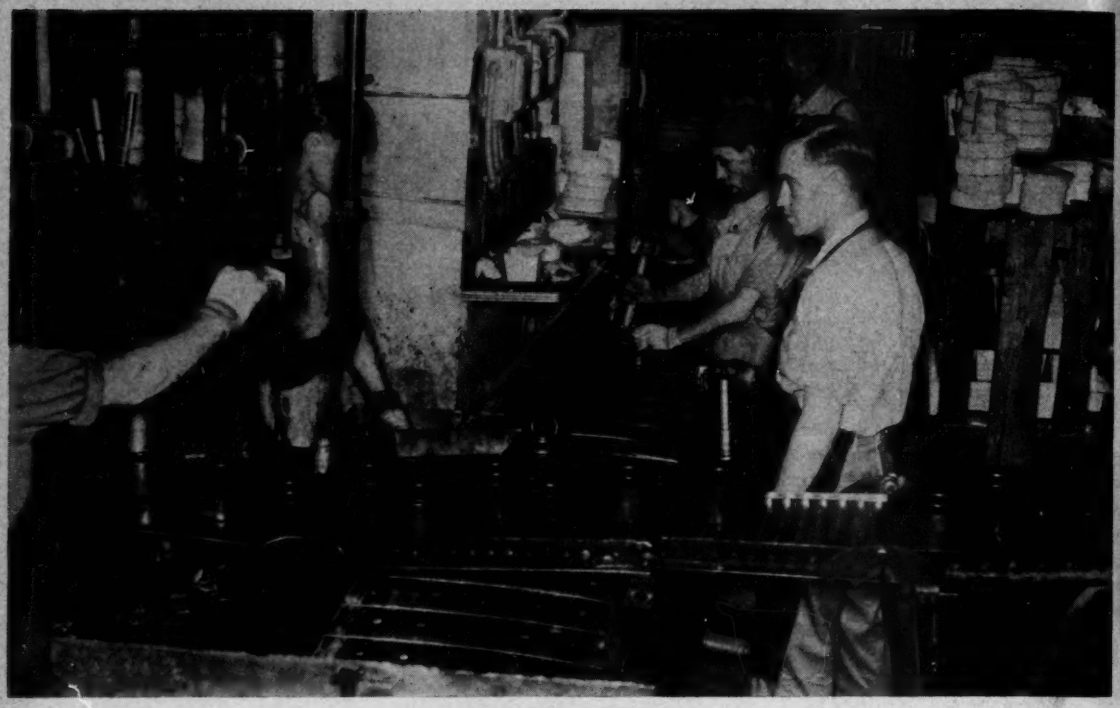


Gear Molding line: Steel slat conveyor withstands pounding as it moves flasks.

When Your Product Is "Different"

When your product "is different," your handling too must be different to meet your manufacturing requirements. Here's a setup involving a comparatively easily damaged product where unusual tailor-made devices are used.

By A. J. HEITZ
Standards Department
The Formica Insulation Company

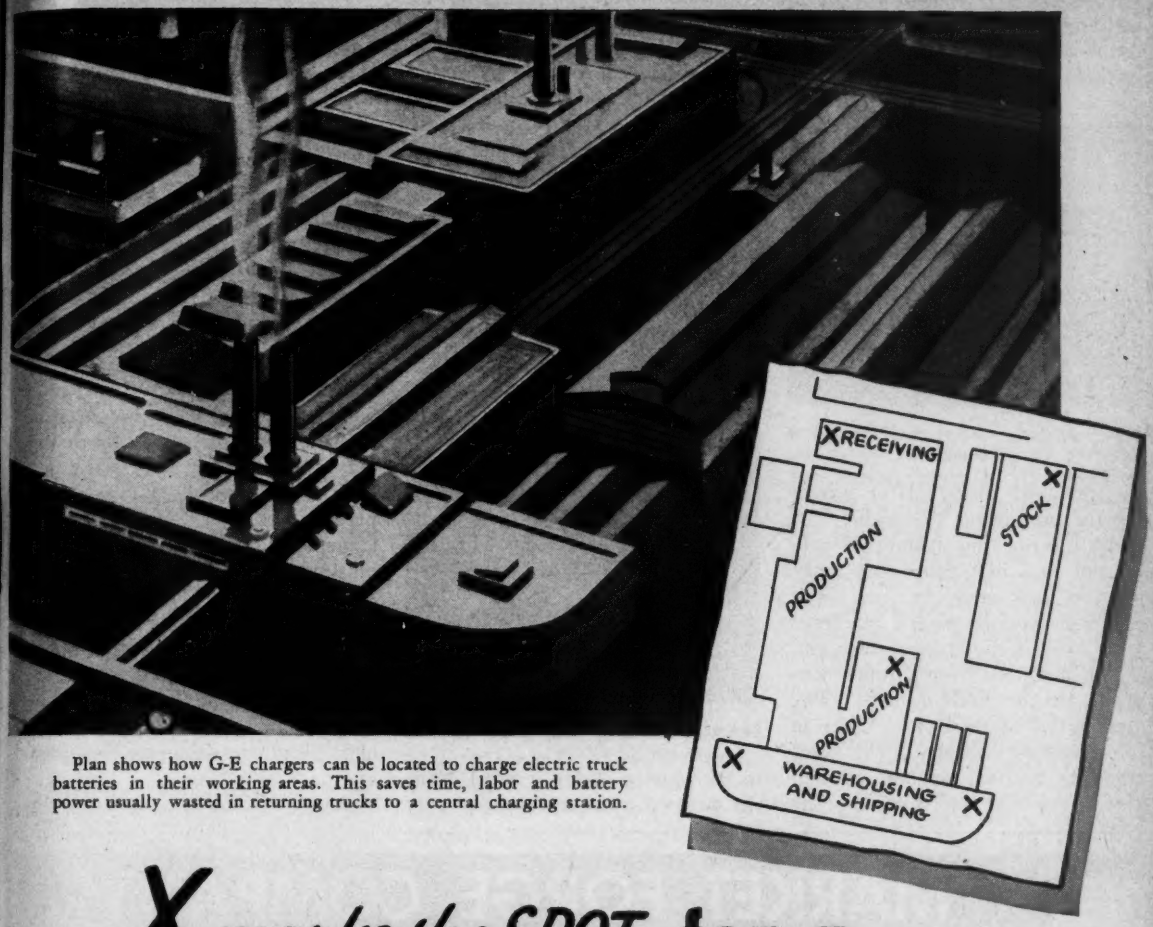
OUR company is a producer of laminated plastic materials. The material is used by others in the manufacture of a great variety of items. It is used extensively in plating barrels, rayon, chemical resisting parts, automotive gears, electrical insulation, X-ray, and radio.

The decorative materials are used for counter tops, table tops, bars, soda fountains, doors, wainscot, and a number of other architectural applications.

The material is in a comparatively brittle condition, easily crushed. It must be carefully handled. The products, in some cases, are quite large, unwieldy, and must be handled carefully to avoid damage. All handling is best at table height. Here's how it's done.

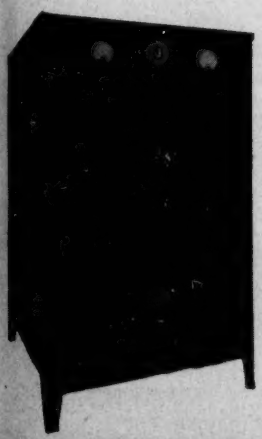
Crimped tape, disks and mascerated material from a treated fabric base are used in the gear

Packs of built-up fabric are moved on table-type platform to hydraulic lift before presses. Lift raises "table" to level for insertion in press.



Plan shows how G-E chargers can be located to charge electric truck batteries in their working areas. This saves time, labor and battery power usually wasted in returning trucks to a central charging station.

X marks the SPOT for a G-E BATTERY CHARGER



Gone are the days when it was necessary to ship electric trucks to a central charging station after long hauls or a hard day's work. Now you can charge batteries in truck working areas by simply "spotting" G-E Copper-oxide battery chargers at strategic locations where they are always ready to do a job. The savings in time, labor and battery power are obvious.

The charger is easy and economical to use. It's fully automatic so—all a user has to do is plug in the connections, turn on the switch and the charger does everything else. It shuts off automatically on completion of the charge and a built-in control prevents batteries from discharging back through the charger after the a-c current turns off.

There are G-E Copper-oxide chargers for lead-acid batteries, nickel alkaline batteries or combination chargers to accommodate both. G-E chargers have no moving parts other than the cooling fan; hence, maintenance costs compared with other types of battery charging equipment are negligible. For full details write: Section A1610-137, Appliance and Merchandise Dept., General Electric Company, Bridgeport, Conn.

GENERAL ELECTRIC

XUM

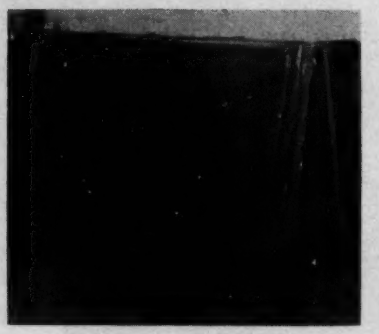
molding line. The mascerated material is put in tapered cardboard buckets and weighed, along with

Table with hinged leaves can be raised or lowered.

the punched disks. After crimping the tape is cut to weight.

An interlocking system of roller, slat and belt conveyors make up the gear molding line. The crimped tape is placed on trays and baked in a conveyor oven and are then routed over a roller conveyor to the molding line. The mascerated material and disks in the cardboad buckets, in the exact amounts needed, are on a shelf above the slat conveyor in the molding line. After the bottom disk and tape are put in the mold, the mascerated material is added from the top and pounded down, so the top disk and top mold plate will fit snugly in the mold shell. This assembly, then, is made on the surface of the slat conveyor. The slats of this conveyor are of steel construction and can withstand the pounding.

The completed mold is then removed from the slat conveyor to a belt conveyor which carries them



Tent-type truck avoids scratching of heavy sheets.

to the presses. Upon removal from the presses, a roller conveyor carries the molds to another work station where the gear is knocked out. This work station is at the head of the molding line, permitting the operator to place the empty flasks or shells upon the slat conveyor where they can be reused in the molding line. This circular line completes what is known as the gear molding line at Formica. It illustrates the principle of loop production flow.

Insulation Board

Formica insulation board is made up of packs which consist of builtup sheets of treated fabric paper or wood veneer. The packs are built up between stainless steel plates. Eight of these packs are transported upon a table type platform, on which they are made. A hand lift or fork lift truck brings the eight packs upon the platform to a hydraulic lift sunk in the floor in front of a press, and by elevating them to the proper heights, they can be easily slid off into each of the eight openings in the press, one pack at a time.

Another material handling set up

MARKET FORGE COMPANY
STANDARDIZED MATERIALS HANDLING EQUIPMENT

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A condensed catalog.

MARKET FORGE COMPANY MATERIALS HANDLING DIVISION 60 GARVEY ST., EVERETT 49, MASS.

has been devised in the feed to the redrying ovens. Here, top sheets of decorative material require dry-

Tapered tote boxes fit into tilted rack at table.

ing, and the ovens are filled by shoving screened trays into the ovens. A table with leaves hinged on one end is used to handle the sheets, when loading and unloading the ovens. A pulley and counterweight help to raise or lower the leaves as the sheets are slid along onto the trays to the ovens.

Heavy industrial sheets of Formica are transported on tent type trucks. This type of truck permits sheets to be removed one at a time without scratching.

Small Parts

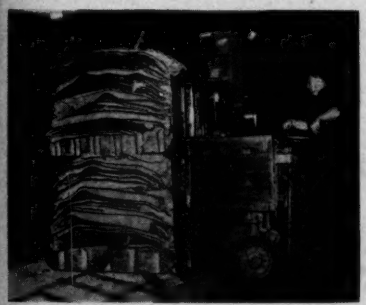
In making small parts such as breaker arms for distributors, the parts are transported from work station to work station in tapered stacking type steel tote boxes. A stand, built of welded angle irons, receives these tote boxes. This stand tilts inward towards the worker, making for easy removal and handling of parts.

Some changes are being made in the plant to eliminate handling and waste of raw material. Hooks on posts make up racks which will receive rolls of material. It is planned to store these rolls ceiling high by inserting a mandrel in the rolls so as to permit their stacking by lift trucks on and from the racks. Similar racks on movable stands have proven successful in storing smaller rolls of decorative material.

LOW AND HIGH

Here is how a low-lift truck has been rebuilt into a double platform model. While the bottom platform operates as a 7" low lift, the upper one elevates to a height of 48". The Upper platform telescopes over the lower one.

The loading procedure is as follows. First the upper platform picks up its load and raises it to the maximum height. When it reaches this, the elevated load is held by a check valve of the hydraulic system. Then the bottom



platform is lowered and the second load is picked up. During hauling, the upper load is lowered on the bottom one, thus locking both securely.—*Courtesy, Goodyear Tire and Rubber Co., Akron.*

FOR TIRELESS WORKERS . . .

(Continued from page 31)

immediately with the purchasing department.

The stockroom measures approximately 20 x 60 ft. It has built-in small-parts bins along a wall and steel bins in the center area for the heavier parts. The 260 small-item bins are divided into sections according to the parts of the various manufacturers stored in them. Each manufacturer has a set of 260 bins assigned for his parts. Bearings are separated according to sizes on a special rack. Small electrical parts are stored in metal drawers, likewise washers, screws, etc. Sample parts of the small electric items are attached to the wall above the drawer locations. This helps identify the numerous items—motor brushes, horn buttons, wire terminals, etc. —for the stock clerk. Similarly, armatures, brakes, and the other heavier parts are stored systematically in specified locations. Two aluminum sheets, affixed to the side of a bin, list all tire sizes, classified according to the various truck manufacturers. A supply of hydraulic guns for hand lift trucks is kept in a special rack. There is always a spare available, and no truck with a defective gun need wait for repairs. This is an important factor at our company, which employs several thousand hand lift trucks.

Lubrication

Just as in the case of periodic inspections and the handling of repairs, a definite system governs the lubricating of the many vehicles. Every powered truck is greased once every 15 days—and for this purpose three cards and a master file are used.

The greaser has at his disposal a master grease file (4) in which 3" x 5" cards are arranged in numerical order from 1 to 31 (according to the days of the month). The truck numbers are indicated in the column "Dates to grease each month," and the second column on this (master) card is for the particular hour when the job is to be done. Thus, the greaser is enabled to know when the various vehicles are to be lubricated.

Guided by this information, he fills out "Request to grease" cards (5) and inserts one in a panel on each truck at the proper time. The specific time on these "request" cards for any particular day is indicated at half-hourly intervals for each succeeding truck. (This is because each greasing job requires a half hour.) Thus there is no line-up of truck operators "waiting" for their vehicles to be greased. Upon completion of each job, the operator enters the fact on the "truck card" (6) indicating truck number, date, and his name. This card goes to the supervisor, who is thus informed that each powered truck is greased regularly once every 15 days.

There is no exception to this rule. Systematic lubrication is an essential part of preventive maintenance.

A housekeeping hint may not be

amiss at this point. We try to maintain our repair shop without having it littered with parts and tools. This applies equally to grease on the floor, which is a hazard. Grease and paints are kept in a cupboard, with every type of material stored on its own shelf. All greasing equipment is kept in a special bin. When the greasing of trucks is completed, it is the operator's responsibility to clean the floor thoroughly with a solvent.

Mobile Unit for Hand Trucks

Since our company's fleet of hand trucks numbers several thousand, it would be a waste of time, if not a physical impossibility, to bring these units over considerable distances to a central point for greasing. So, we bring a mobile greasing unit to the various departments in rotation. This unit is a four-wheel push truck completely equipped for the job. It contains an air pump, air tank, an air grease gun, necessary jacks, tools and spare Alemite fittings to replace broken ones.

The supervisor informs the greaser about the rotation of departments to be served. The operator reports to each department at the designated time, sets up his equipment in a clear space, which is near an electric outlet. After covering the floor with a cloth, he starts greasing the trucks. A similar greasing record system is maintained for the hand-operated units as for the powered trucks. The hand trucks are thus lubricated once every three months or more as needed.

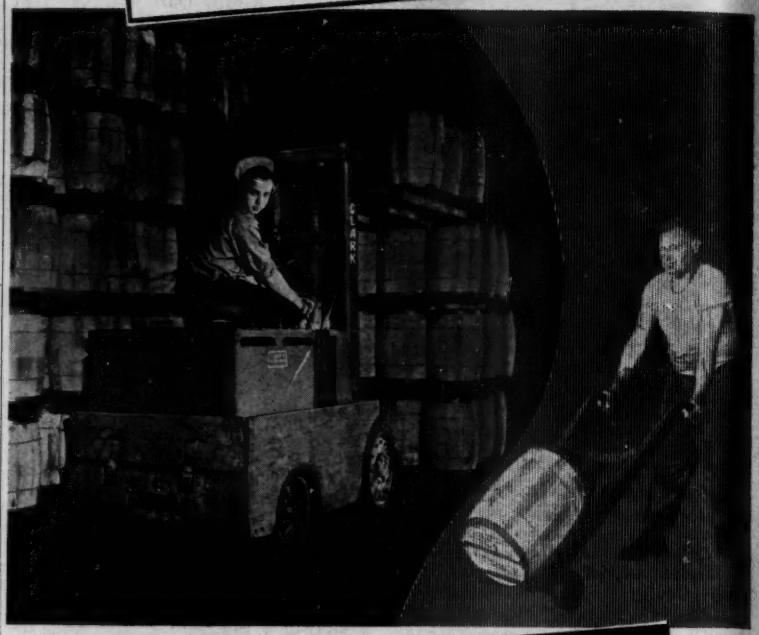
In this way "Goodyear keeps 'em rolling." The story is here given in some detail because good maintenance means good transportation—and both are essential to the economical mass movement of goods and on-schedule production.

(In an early article Mr. Paul will discuss another phase of the Goodyear Company's inside power trucking operations.—Ed.)

CORRECTION

In the December article "What Do You Know About Your Costs?", page 54, Figures C and D, the annual saving of the palletized loading method was erroneously given as $2,770.00. This figure should have been $277,000.00

This •• or THIS



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THE Hauser-Stander Tank Company is engaged in the manufacture of specially constructed round, rectangular, or irregular shaped tanks. This organization has been building wood tanks for more than 75 years.

An overhead monorail system services most of the mill and travels past bins and sheds in the lumber yard to the spur for incoming freight cars. A boom with a herringbone connection at the end of the monorail system permits the traveling hoist to pass out over the flat top or gondola freight cars and unload lumber with the aid of slings.

Heavy timbers are carried by the hoist to the proper bins where, with the aid of a roller or small piece of pipe, they can be shoved into storage. Two sets of monorail tracks about 3 feet apart, permit the use of more than one hoist as they pass the bins and so no time is lost in waiting. Transfer switches aid in swinging loads from one monorail line to the other.

Timbers removed from the bins are carried by monorail over a cut-off saw beneath a gabled roof in the yard. Here they can be cut to length. Doing the operation outside eliminates the hauling of offal from inside the shop.

As the monorail enters the mill a 3-way switch aids in routing the material to the proper work station (rip saw, cut-off, or planer and or molder). A table with 3 rollers receives the timbers from the sling and aids in feeding the timbers into the rip saw.

Huge finished tank like this is moved on dollies, then pushed by tractor on flat car.

Some of the larger timbers are carried to a surfacing machine by means of a double hook carrier. The use of this carrier permits one operator to handle the long timber with ease. By guiding one end of the carrier, it is possible for him to set the long timber in the right position on the roller bed which feeds the surfacer.

After surfacing, a belt type sling transports the material by monorail to the boring machines. The timbers are guided into position for boring by means of a hand operated roller.

After boring, the timber is taken by the belt sling and the monorail to the beginning of the tank assembly operations. This is located

Boom with chain hoist unloads timber from cars.

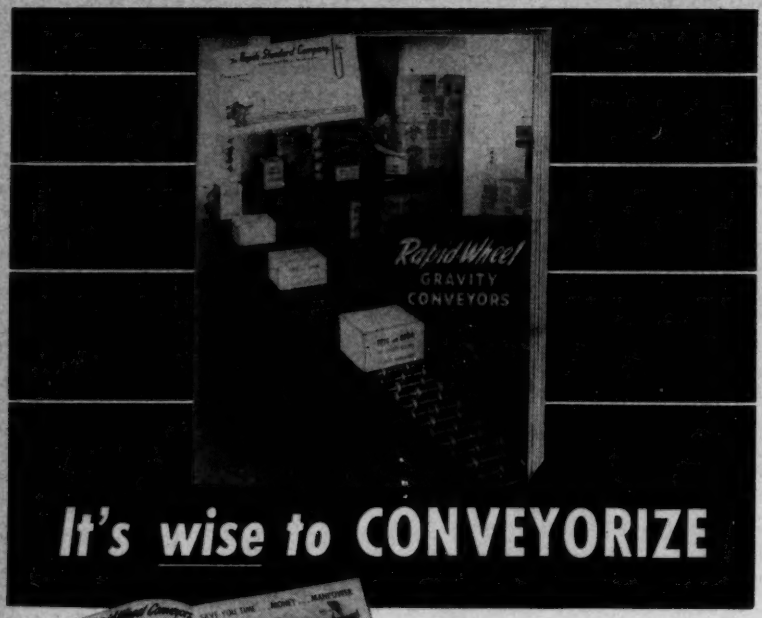
at the other end of the monorail system. A hand propelled crane aids in picking the pieces up in the work of assembling the tanks.

Monorail system moves timber to storage sheds.

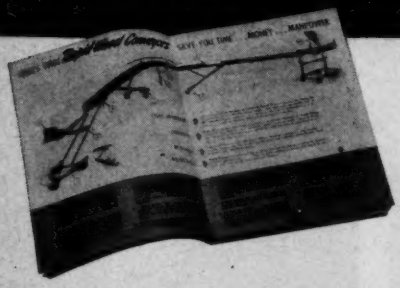
The large and heavy tanks are assembled on bucks a few inches off the floor. When completed, four-wheel dollies can be slid under the tank with ease. The tank is then pushed by a tractor truck

Chain hoist with extended hand wheels spots timber.

to a dock a few feet away. Bridge plates are set into position on the



It's wise to CONVEYORIZE



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dock and flat top rail car. The tractor then pushes the tank onto the flat top.

Other lumber in the yard is brought into the mill on wagons. Planks, etc. are loaded onto the two wheel wagons with supporting legs. On the tractor truck is a clamp which can be moved up or down. Two pieces of lumber on the wagon in the center section of the bottom row are grabbed by this clamp attached to the tractor truck at a height sufficient to raise the legs of the wagon off the ground. The load is then pulled by the tractor into the shop.

Hand-operated rollers move timber back and forth.

Planks are hauled by tractor with clamp at back.

R. M. L. FRANCIS, Managing Director of National Adhesives Ltd., Slough, England, has arrived in New York on his first visit since prewar days.

Obbe Meijer, Managing Director of Nationale Zetmeelindustrie, N. V., Veendam, Holland, has also reached the New York headquarters of National Starch Products, Inc., and will attend a meeting of all managers of foreign plants.

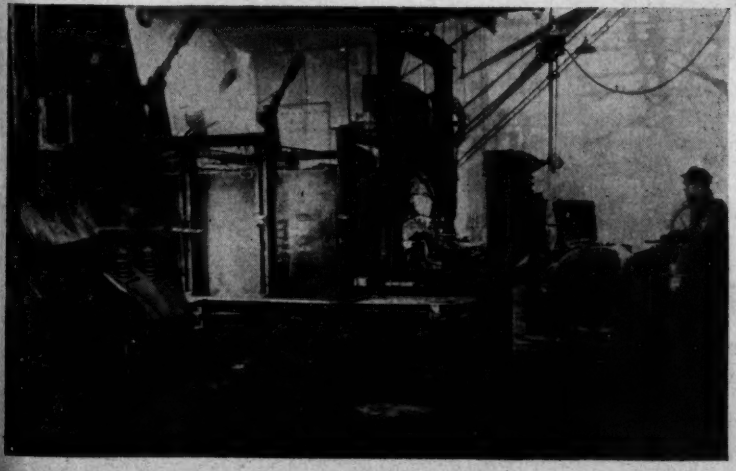
Handling the Heavyweights

Upper photo: 10-ton crane racks long bars. Right: Cut-to-length stock, piled in skid bins, is then moved by platform trucks to temporary storage.

The loads common to forging operations must be so handled as to permit cooling after forging or heat treating. These loads are comparatively heavy and means must be provided whereby no extra handling is necessary.

FOUR to six thousand pound capacity industrial high lift trucks (elevating platform type) and skeleton-type skid bins are used at The Steel Improvement & Forge Company, Cleveland, Ohio, to move forging stock (once the stock has been cut to a suitable length) through a series of process operations.

The truck and skid method of material handling permits the flexibility in the material flow so



Foraging stock is spotted near furnace, empty skid bins then receive finished pieces from hammer.

necessary since the shape of the part to be forged and the properties to be developed may require only a few operations, or may involve a series of many operations, to produce a finished forging. The skeleton-type skid bin is also capable of handling forged parts of many different sizes, and permits cooling to take place while the work in process is in the skid.

Handling the skids by truck allows the loaded skids to be moved frequently to temporary storage areas in the yard where the parts are allowed to cool or to accumulate in sufficient quantities to make setting up for the next operation practical. This is important since the basis of producing commercial duplicates in forged parts is through the use of impression dies. Each forged part of a different shape or size requires, usually, a separate set of dies and trimming tools.

The first production step in the forging plant is to cut the stock to a suitable length. This forging stock consists of long bars of metal which are racked in an open storage area along a rail spur on which incoming stock is brought on freight cars. Two 10-ton overhead travelling cranes, cab-controlled, unload and rack the stock.

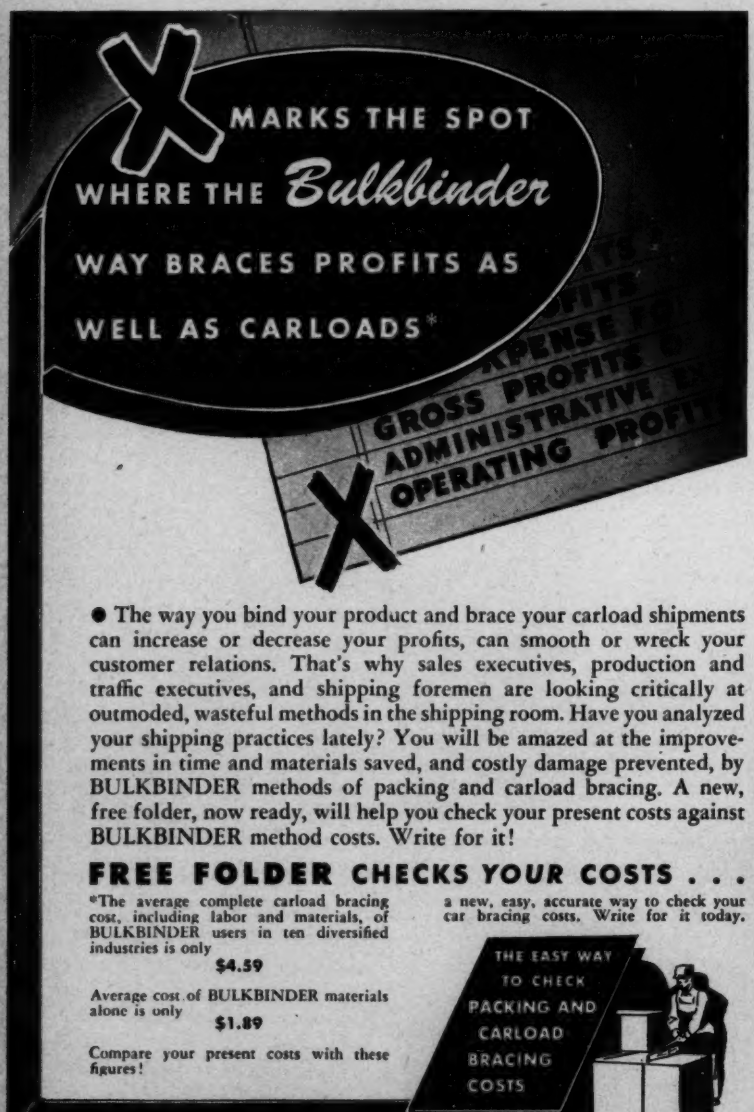
If the bar stock is to be cut by circular cold-cut saws or by cold cutting hacksaws, the stock is removed by the overhead crane to a transfer wagon set in channel tracks. This transfer wagon is then pushed down an incline into the shop where the bars are removed by an overhead monorail hoist which serves the sawing department. The platform lift truck spots the open box type skids along the discharge end of the saws and through the heating, forging, cooling and finishing operation the forged stock is handled in the skid.

Skid bin of finished forgings being loaded by platform lift truck into outbound highway trailer.

Heavy dies, like the one shown, are moved by trucks and positioned in beds of forging hammers.

Platform lift trucks move the skids.

Cold shearing of billets and bars, however, is the most common method used on low and medium carbon steels and on low carbon alloy steels. The beginning of operations is the removal of this stock



● The way you bind your product and brace your carload shipments can increase or decrease your profits, can smooth or wreck your customer relations. That's why sales executives, production and traffic executives, and shipping foremen are looking critically at outmoded, wasteful methods in the shipping room. Have you analyzed your shipping practices lately? You will be amazed at the improvements in time and materials saved, and costly damage prevented, by BULKBINDER methods of packing and carload bracing. A new, free folder, now ready, will help you check your present costs against BULKBINDER method costs. Write for it!

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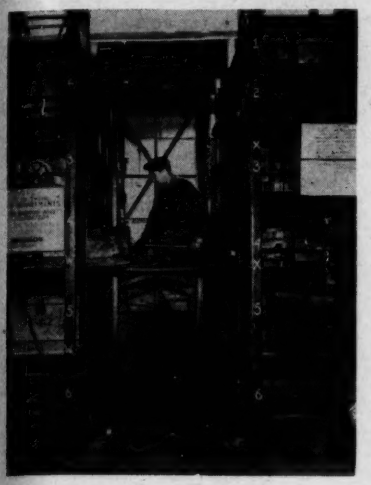
by the crane to a roller bed, which lies beneath the crane runway, and extends into the shop to the shearing machines. At the discharge end of the shear, open box type skids receive the forging stock cut



Dies are kept in these racks served by portable elevator shown. Horizontal and vertical mobility simplifies handling of dies, transfer to trucks.

to suitable length and the flow thereafter is handled in skids moved about by the platform lift trucks.

The finished forgings (in most cases) remain in the skid until shipment. Industrial trucks move the skids from the shipping room onto freight cars where they are unloaded. A skid full of forgings often is carried from the shipping room to a waiting highway truck in the yard and elevated to the level of the highway truck bed where the skid is spotted with ease.

The flexibility in the movement of heavy material from operation or place to place, makes the platform lift truck and open box type skid invaluable aids to the production flow. Pieces of many sizes, shapes, and physical requirements, any one of which will change the route of flow, are handled efficiently and with ease through the forging and subsequent operations.

Many dies are made in the die department in a separate building. Die blocks are moved into position on machines by the use of jib cranes, one at each work station. A pendant controlled overhead travelling crane, in each bay, moves the die blocks from machine to machine. The finished die is taken to die storage racks on platform lift trucks. A portable elevator aids in placing the dies in the upper racks of the die storage area. The transfer of the dies to the hammers from the storage area, however, is handled by the industrial trucks. For positioning the dies at the proper level in the hammers, the industrial lift trucks have proven ideal. Thus, maximum use is made of the mechanical handling facilities on hand.

Wirebound Containers

WIREBOUND crates and boxes of many designs are being used in increasing quantity both for domestic and overseas shipments, according to recent announcements of the Wirebound Box Manufacturers Association. Shown here is a crate of fresh potatoes en route overseas. The wirebound container is claimed to save weight, space, cost and amount of wood used. The Quartermaster Corps this year requested approximately 5,000,000 crates for shipping 500,000,000 pounds of potatoes. According to another announcement by the association, West Coast fruit and vegetable growers have also started to use similar crates for shipment of produce East by plane to eastern cities.

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THE UPS and DOWNS OF HANDLING

Elevators must meet demands of modern handling methods—how to maintain the "lifeline" to all floors.

IT IS significant to note how active many area trade associations are in promoting improved material handling techniques and storage practices within their memberships. These groups form wholesale grocery, drug and pharmaceutical, warehouse, purchasing agent and other organizations. They are well aware of the importance of standardization of equipment and practices, as far as possible, bearing in mind the trends of the future. The interest has reached such a pitch that prearranged tours of modern installations in the vicinity of members are made, even though it may be necessary to observe the practices of another industry. Such visits are followed by meetings for discussion purposes, preliminary to formulating standards, particularly pallet dimensions, which are basic to all other equipment. In this way programs are developed by members for their specific industries.

Multi-story buildings are commonly found in these fields, as well as in many others. Some of these buildings are used because they have proven best for their type of product, while others merely continue long-established customs. In all current construction programs, indications tend toward fewer number of stories than formerly. Warehouses must be strategically located and therefore are usually found in built-up sections where land values are an important factor. Hence multi-story buildings are utilized. Frequently such buildings are required for warehouses, as well as for other plants, due to a difference in level of railroad sidings and street.

Too Little and Too Late

Many of the existing multi-story buildings, whether used for manufacturing or storage, are undesirable today because of inadequate elevators. Their capacities vary from 1,000 to 4,000 lbs., whereas the minimum capacity of a freight elevator should be 6,000 pounds. In fact, elevators of 7½ to 10 tons should be commonplace. Many are too slow and a majority too small. They should be at least 8 ft. wide and 10 ft. long and be provided with 8 ft. headroom clearance, through doors as well. Safety doors of the automatic type are desirable, for too frequently shafts are left unprotected when manually operated, unless the closing of the doors is necessary to provide electrical contact.

There is nothing more disheartening to one conscious of the handling of material than to find an adequate elevator that is so poorly located that it cannot render the service required of it. Never stint on space for your main means of access to upper floors, for the extra investment will be wasted many times over due to congestion and costly operations. For example, elevators are installed at a side wall adjacent to the shipping or receiving platform directly in the only avenue of access to the ground floor. They also are tucked in a corner out of the way. In either case, they cause undue congestion and prove impractical.

In most instances, the greatest efficiency is obtained by installing the elevators in the longitudinal center of the building with the doors, front and rear, in line with cross aisles. If a center latitudinal aisle is desired, the elevator should be placed 10 to 15 feet to the side of this center aisle.

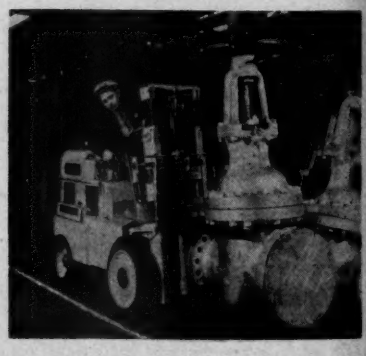
For Transfer Between Floors

It is not generally necessary or practical to elevate or lower powered platform or fork trucks bearing loads. Transfer between floors can best be made by equipping the elevator operator with a hand lift truck of platform or pallet type for loading and discharging the elevator. Some companies have found it convenient to spot dollies adjacent to elevators where fork trucks can deposit pallet loads handy for the elevator operator. He simply pulls the loads aboard with a bent metal rod or hook. Generous size casters on dollies and automatic leveling elevators facilitate such an operation.

OVERSIZED VALVE PROBLEMS LICKED

A FULL FORK—Single, heavy, large objects or a pallet load—it's all the same to a fork truck. The ones shown here are at work in a plant of one of the nation's largest valve manufactur-

ers. The trucks are contributing appreciably to the reduced cost of the finished product. Specially adapted fork attachments permit the huge valves to be handled swiftly and safely.



Multiple loads of smaller units are handled on simple pallets, which sharply reduces car loading time and cost. —*Courtesy, Clark Tructractor Co.*

READ ALL ABOUT IT . . .

(Continued from page 20)

Are you planning to improve your elevator facilities or a new building? If you are, contact the representative of a reputable elevator company and acquaint him with the job cut out for the installation, to make certain adequate equipment will be properly located. It would also be well to have your supplier of industrial handling equipment double-check the recommendations—if you do not have someone in your organization specializing in material handling. In any event, do not overlook the fact that in a multi-story building the elevator is the lifeline to all floors. handling and time. Today's method has naturally resulted in operating economies and improvements which are considerable. Hence it will be used as long as no faster or more satisfactory method can be found.

Mechanically Speaking

The Cranes: The cranes have been in continuous operation since 1939. The maximum working radius from the pivot is approximately 51 feet, 3½ inches, and the current is 230 volt D. C. The hoisting speed with a 10,000-pound load is 250 feet per minute. The rotating speed loaded is approximately ½ R. P. M. Clearance under the job to the water level is 42 feet; operating weight is 80,000 pounds. While the motors and controls for this installation are standard equipment, they were specially adapted for the unloading of newsprint.

Spreaders and Plugs: The spreaders used for unloading the paper from the ships are adjustable to rolls of various sizes. Another feature are the plugs used on the spreaders. The steel plugs are covered with a ½-inch-thick layer of rubber. This was designed both for the safety of the men and to prevent spoilage of the paper. If a plug should hit a stevedore's head, the soft coating will prevent the more serious kind of injury that would result from the impact of uncovered steel. The rubber surface of the plugs also tends to prevent damage to the cores when the cranes lift the rolls. (Note: Warehouse Superintendent von der Horst holds a patent on these rubber-coated plugs.)

Other Features: The 12-inch gauge track runs parallel to the aisles practically throughout the warehouse area; it crosses a main aisle only at one point. Here an automatic alarm signal is installed, which sounds a horn and flashes red bulbs. Outside sections of track, passing over ramps, are equipped with gates, permitting free access to doors or crosswalks when the system is not in use. These safety and convenience features contribute to the efficiency of the installation.

During the close of the navigation season, newsprint is received daily in trainloads. The method used for transferring the rolls from the cars to the dollies is similar to that used when paper is received from the ships. A portable inclined ramp is installed between the cars and the track. The rolls are hoisted to the ramp by tiering machine, then rolled on the waiting dollies.

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AT THE Joyce-Gridland Company, Dayton, two novel ramps are installed in front of the truck loading dock, facilitating handling operations into and out of trucks and trailers. These ramps, or loading dock lifts, are hinged floor surfaces made of checkered steel floor plate, with angles and channels composing the framework.

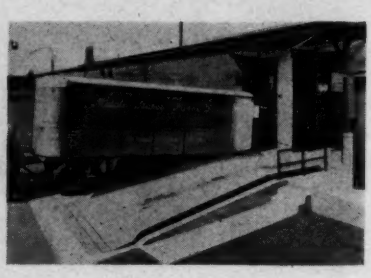
Each ramp is 17′ 7″ long, and a hydraulic lift is below the rear section of the surface, which measures 8′ x 9′. It can raise or lower a truck 66 inches so that the bed of the vehicle will be on a level with the shipping platform, or above or below it, according to need. The accurate leveling of truck beds by the lifts is also helpful when outbound units are loaded by means of industrial trucks which drive with their loads into the larger vehicles.

The plant's overhead monorail system extends to the shipping platform and has a telescopic extension. The latter will propel into or over the body of a truck and permit the unloading of heavy pieces directly from the hoist.

Because of the coordination between the loading docks, lifts and the overhead monorail equipment, accurate positioning of vehicles and easy spotting of loads are made possible with minimum handling. Once the product has been picked up by the hoist it need not leave the monorail system until it is loaded into the outbound vehicle.

Company representatives state that the present method is saving many manhours formerly used in handling operations.

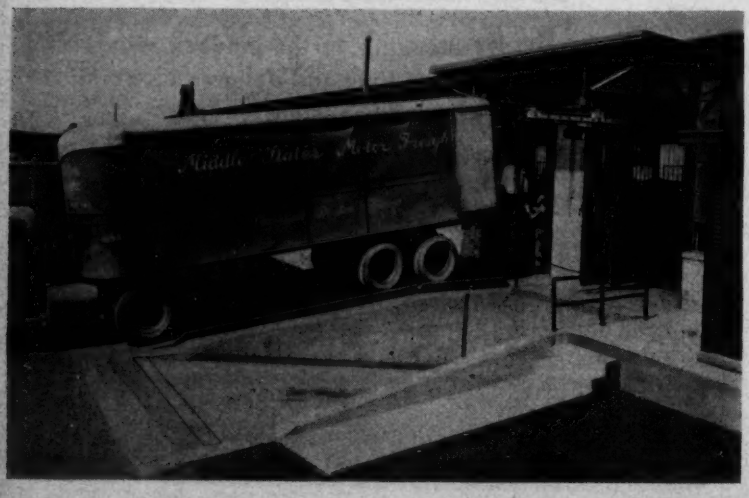
Loading dock lifts: one is raised, one lowered.



This dock lift has truck aligned with plant floor.

This extension interlocks with monorail system.

Lift has raised truck so that trolley on telescoping boom can take load inside the vehicle.



NEW LIGHT ON CARLOADING OPERATIONS

ACCORDING to the Navy, in recent years 75 per cent of the total amount paid by the railroads for claims has been for damage and loss in cars loaded by the shipper.

One of the most important aspects of carloading is the selection of the proper type car. Large and bulky material can best be loaded in double door furniture or automobile cars or in some instances in cars equipped with end doors. The next step is the inspection of the car for sound walls, floors, doors and in many instances a sound roof in order to provide protection against water damage. All the old dunnage and nails should be removed.

The next problem to be considered is proper stowage. It is necessary to load all cars to capacity both as to weight and volume. Because of the acute shortage of freight cars, available cars must be loaded to the maximum weight limit (marked on the sides of the car). Every 1 per cent increase in freight car utilization gains 19,552 cars. Save as much time as possible in loading and unloading. One minute saved nationally, in car utilization, represents 904,000 ton miles. Keep empty space at a minimum by loading tightly against the sides and ends of the car and as

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FEB. 4 THRU 8

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More than 350 manufacturers have reserved some eight acres of display space. Technical program will be concentrated into sessions on Monday and Tuesday with a special lecture on Wednesday and educational lectures on Thursday and Friday.

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NATIONAL METAL CONGRESS AND EXPOSITION

FEBRUARY 4TH THRU 8TH

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high as practicable. The higher the load, the more possibility of damage due to rough handling and therefore it becomes increasingly important to stow and brace all shipments properly. Contents of the car should be stowed tightly against the ends and the sides with only a minimum amount of empty space.

Blocking and bracing will vary

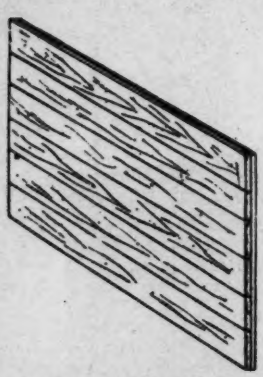

Figure 1. Double-faced solid intermediate bulkhead or gate.

with the type of commodity to be loaded. Items that must be loaded on open top equipment require particular attention. Standard packaged items shipped in solid carload quantities require suitable bracing to prevent damage in transit.

The proper distribution of weight over the area of the car floor is important. All loading should be uniformly distributed and the weights should not exceed those specified in the loading rules publications issued by the Association of American Railroads.

Bracing and blocking of mer-

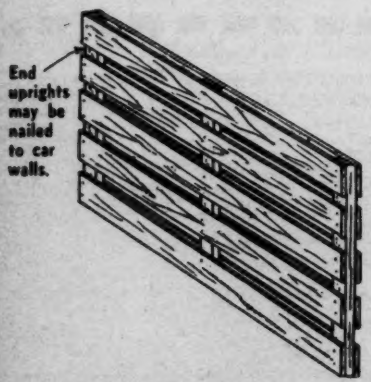

Figure 2. Double-faced slatted intermediate bulkhead or gate.

chandise may be accomplished by the use of wood, round wire, flat steel strapping or a combination thereof. It is advisable to break up solid heavy loads by using divisional type gates, Figs. 1 and 2.

Car Bracing

When it is necessary to attach wood blocking to the car walls it is recommended that all nailing be into the vertical studs rather than into the thin sheathing. When this is impossible, due to the location of the load in the car, it is recommended that additional back-up blocking be extended to the next available stud in order to provide a sound nailing area.

Similar principles, as listed above, are involved in the application of steel strapping for anchoring carload shipments, Figs. 3 and 4.

Floating Load

Another type of steel strap loading is known as the "unit or floating type" load in which units are tied together within the car. It is necessary to provide space between "floating" units to allow for movement under impact. The amount of space between units varies according to the type of load. Loads that offer a high friction surface against the car floor require less space between units than do the loads having a relatively low friction surface. The "float" or "unit" load (in Fig. 5) may be modified by the use of anti-skid plates or mechanical brakemen, or other similar devices which tend to retard the amount of shift under impact.

The bulkheads or gates used within cars should be provided with some type of hold-down bracing. A great majority of gate failures may be traced directly to the lack of this type of bracing. Wall anchored metal strapped loads may require the use of a truss at the center in order to provide uniform compression across the face of the load (Fig. 6). The use of staples is recommended to insure that all strapping will remain in place during transit.

Because of increased speed and longer trains, all merchandise may be expected to receive rough treatment. It is necessary to provide additional bracing to compensate for rough handling. Larger fabrications loaded on open-top cars should have DO NOT HUMP cards prominently displayed. Explosives and other dangerous or fragile commodities loaded in freight cars should be similarly marked.

Doorway bracing should be provided for all loads that extend through the door area of the cars. Wood bracing or steel strapping may be used for this application. (See November issue). Some commodities require maximum protection against damage from water or

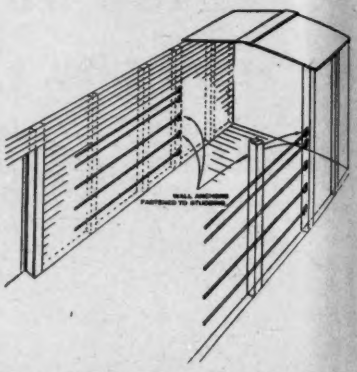

Figure 3. Fastening anchor plates to car wall.

dust. In such instances it may be necessary to apply waterproof paper barriers at the doorways to prevent rain, snow or dirt from filtering in.

Loading and bracing of commodities in cars equipped with special loading and bracing devices, should conform with recommended practices advocated by the manufacturer.

Handling Cartons and Boxes

All cartons or boxes should be stowed as tightly as possible in the car. Cartons and boxes should be loaded so that their stiffest and strongest direction is longitudinally

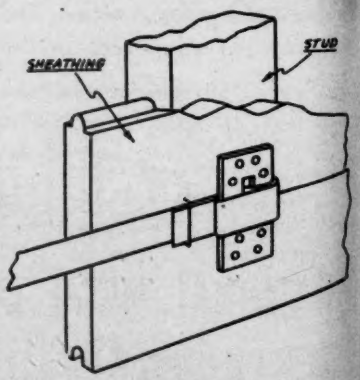

Figure 4.

in the car. Stacks should be staggered so as to have void spaces at the alternating sides. Keep the load as level as possible and use

extreme care in placing cartons so as to prevent their crushing from the pressures developed under impact in transit. Avoid loading cartons of greatly different strength and weight in the same unit. The pressure of the heavy cartons may crush the lighter ones. Keep the load as low as possible and utilize

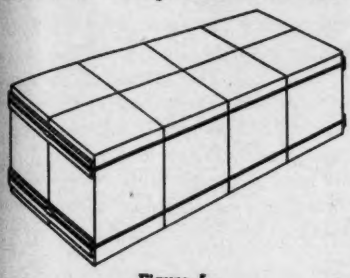

Figure 5.

all the available floor space to reduce number of layers.

Planning of Load

Plan the bracing of the load to provide equal distribution of pressure throughout the car or with respect to the ability of the load components to withstand pressure. A unit of light weight cartons may be loaded in the end of a car with a single gate at its front. A heavy unit of cartons will require a divisional gate (Figs. 1 and 2) at the center of the unit with a gate at its front. Normally, a unit of cartons weighing over 20,000 pounds should be considered a heavy unit and should be provided with a divisional gate to reduce the pressure of the load, both at the end wall and at the gate. Wood boxes or heavy wire bound boxes do not require such division of load due to their ability to withstand pressure to a degree greater than that of a carton.

A division of the load in a heavy carton unit, in addition to reducing pressure, reduces the accumulative slack that may develop lengthwise of the car. In many instances the bottom layer or floor load can be loaded solid from end to end of the car, while the balance of the load is placed on the upper layer or layers and bulkhead. For fragile items, such as cartridge cases, clay targets, etc., the bottom layer should be divided into units according to the weight. If the load plans out conveniently, the bottom layer may be loaded straight through the doorway and have two divisional gates which divide the bottom layer load into three equal units.

Where top layers are required, and the top deck load is not materially reduced by loading the bottom through the doorway, then

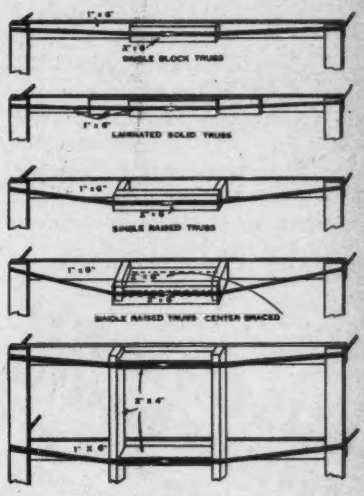

Figure 6. Effective truss arrangements.

it is more desirable to leave the doorway space open and brace both the bottom and top layers with a single gate or bulkhead. This is the type load most frequently used

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and it has the added advantage of reducing load length, and consequently the load pressure.

Preparation of Car for Metal Strapped Loads (Wall Anchored Type)

The car should be inspected carefully and all nails and bolts removed or secured in place. The floor should be clean and covered with a sheet of car liner paper. If boards are missing from the floor or wall, repairs should be made. The table on page 21 indicates size and number of straps for different types and weights of load.

The most general type car will have two gates—one on either side of the doorway, bulkheading the units in each end of the car—or four gates, two front gates and two divisional gates. In both cases the location of these gates will be determined before loading and straps will be fixed to anchor plates which will be nailed to the car walls with the proper size of drive screws or nails. The anchor (Fig. 4) must be nailed only at a wall stud and never to the sheathing between studs. This necessitates placing the anchor plate so as to come back of the load—toward the end wall of the car, and secured to the first or nearest stud. Usually a stud can be located within three feet of the face of the load, but in some instances it may be necessary to go further back in order to obtain sufficient anchorage. Some cars have 2" walls and have no vertical studs, in which case anchor plates may be secured at any point to the rear of the face of the load. The straps must also be located for height so as to coincide with the center of the gate cross pieces. When loading cartons the anchor plates must be covered with strips of corrugated or fiberboard to prevent damage.

Gate or Bulkhead Construction

Care should be taken to insure that gates fit the car width snugly and shall not be less than ¾" narrower than the car width. The gate cross pieces should be located so as to contact the carton or box load at the top and bottom of the cartons and never at the center of the carton alone. The best practice is to have a cross piece at the extreme top and extreme bottom of the load and additional cross pieces at each layer intersection. Uprights should be nailed to the cross pieces and care should be exercised that all nails are well clinched over and will not puncture the cartons.

Courtesy, The U.S. Navy Bureau of Accounts and Supplies.

Save up to 30% on handling costs with Buschman Roll-or-Wheel Portable Conveyor. Available in roller or wheel type. Wheels are free-running, full ball-bearing.

Standard sections are 5' and 10' in length. Convenient to carry from place to place where needed. Easily, quickly coupled together to any length without tools, thru exclusive "Quick-Eez" coupling feature. Curved sections are available in 90°, 60°, 45°, and 30° sizes. Mobile units are mounted on swivel casters.

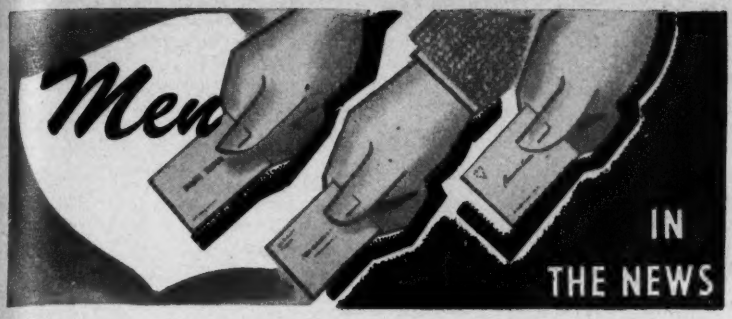
Stands are 4-legged, providing adjustable heights from 12" to 48". Low in cost!

WRITE FOR BULLETIN 10 SHOWING APPLICATIONS

THE E. W. BUSCHMAN COMPANY, Inc.

432 NEW STREET **CINCINNATI 2, OHIO**

IT GOES TO MOUNTAIN—The location of piles of scrap, slag, gravel or sand can be almost anywhere in the yard area when a traveling crane is at work. At the same time economical use is made of available space. Many types of loose materials are easily handled by means of the grab bucket. This type of unit is readily adapted to other operations by a change of attachments. —*Courtesy, The Hughes-Keenan Co.*



ELMER C. SALZMAN has been appointed vice president in charge of export operations of Robins Conveyors, Inc. Mr. Salzman was located for 14 years in London as engineering manager for the Robins company.

THE Mercury Manufacturing Company announces the appointment of W. Blackman Davis as representative of that company's lines in the state of Texas. The Lusk Equipment and Supply Company has also been appointed to cover parts of Kansas, Colorado, and Oklahoma. Announcement was also made that John R. Henkle and George Hettinger have terminated their Army service and have returned to the expanding sales organization.

APPOINTMENT of Frederick W. Roth as Works Manager of the Storage Battery Division of Philco Corporation was announced today by M. W. Heinritz, vice president in charge of the Division. Mr. Roth joined the Accounting Department of Philco in 1933 following his graduation from the Wharton School of the University of Pennsylvania. In 1938, he was named Chief Accountant of the Storage Battery Division and for the past four years has been Office Manager and Chief Accountant of the Division.

F. W. Roth

LINK-BELT COMPANY announces that Joseph W. Sears, heretofore district sales engineer at the Link-Belt plant in Dallas, has been appointed district sales manager with headquarters at Houston. Also announced is the appointment of Stuart Penick as district sales engineer at Dallas, to fill the vacancy created by Mr. Sears' transfer to Houston.

Mr. Sears received his engineering education at Armour Institute of Technology (now I.I.T.), Chicago Technical College, and Austin Evening School, Chicago. He entered the service of Link-Belt Company in 1935, starting in the engineering department of the Pershing Road plant, Chicago. He continued in the employ of the engineering department five years before he was transferred to the Chicago general sales department. In 1941, he was transferred to the sales department at Dallas; in 1943 he was appointed district engineer.

J. W. Sears

Stuart Penick

Mr. Stuart Penick entered the employ of the Link-Belt Ewart plant, Indianapolis, in the engineering department in July 1935, immediately after receiving his B.S. in mechanical engineering at the University of Texas. He has for the last three years been employed in the engineering department of the Pershing Road plant in Chicago.

OPPORTUNITIES

MEN WANTED . . . JOBS WANTED . . . LINES AVAILABLE . . .

RATES: minimum, 25 words, $2.00; each additional word, 10c. Bold type or all capitals: minimum, 25 words, $3.00, additional words, 15c. All insertions are payable in advance.

LINES WANTED

A mechanical engineer specializing in material handling equipment, with twenty years' experience in sales engineering, designing, construction, and installation of such equipment, would like to communicate with manufacturers who want representation on the Pacific coast in overhead handling equipment, cranes, hoists, monorails, elevators, lift trucks, conveyors, and special handling devices and accessories. Box 14, FLOW.

Manufacturer's Representative open for lines of Production Equipment and Material Handling Equipment in the Southwestern States of Texas, Oklahoma, and Louisiana. Successful selling to Jobbers, Industrial, and Oil Plants in this area. Box 17, FLOW.

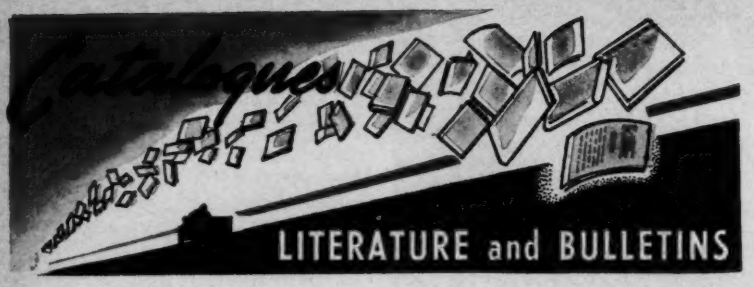
Attention: Material Handling Equipment Manufacturers—Do you need representation in Cleveland, Ohio, and surrounding areas? We are interested in obtaining additional equipment. If you manufacture skids, pallets, castors, conveyor equipment, overhead handling equipment, hand trucks, barrel trucks, and similar materials handling equipment, please contact us. Box 15, FLOW.

HELP WANTED

WANTED
INDUSTRIAL SALES ENGINEER

Technical graduate, mechanical, electrical or civil, age 25-36, at least 3 years practical experience in factory material movement, preferably equipment phase; elevator knowledge a desirable equivalent therefor; splendid opening as assistant department head with long-range future for right man. Headquarters in Eastern city convenient to New York. State business history and other pertinent data for prompt interview. Box 125, Flow Magazine, 812 Huron Rd., Cleveland 15, Ohio.

SHIPPING SUPERVISOR—$4,000-$6,000, must have ingenuity, imagination; experience in modern methods of material handling, fleet operation, stock control, etc. Under 40. College education or equivalent. Ohio job, food industry. (State all in first letter, including present earnings.) Box 16, FLOW.



101. Pallets . . . A well illustrated booklet showing the use of pallets and the projected application of palletized loading in production and warehouse work. Descriptions of design to fit individual specifications and specifications on the company's particular lines of pallets, skids, and lift lines are included. By the General Box Company.

102. The Truck of a Thousand Uses . . . Two booklets describing a platform type shop truck which is designed to show the application of this powered equipment in actual operational problems. A Buda Company presentation.

103. Accurate Production Control . . . A completely illustrated booklet describing the place of visible files and record keeping for production and material handling applications. Typical job history records are illustrated and control cards showing both follow up and delivery flow are pictured. Various ideas of simple forms for the inclusion of much information in a small amount of space for little handling is included. Prepared by Postindex Company, a division of Art Metal Construction Company.

104. Data File . . . Colorfully illustrated analysis of design and production features of Towmotor Corporation's lift trucks. The file includes an operator's guide and a materials handling analysis guide for application to managers of factory, warehouse, and terminal operations.

105. Articulated Trucks . . . A four-page folder by The Baker-Raulang Company describing a four-ton capacity articulated fork truck, with specifications on both its operation features and its technical installation features. A short section on steering will be of interest to pallet handlers.

106. Containers . . . An eight-page description of industrial containers for use in tote boxing as stacking boxes, skid boxes, stacking shipping boxes, and box trucks and for temporary storage purposes. A spread included shows the various containers "in action." An idea producer presented by G. B. Lewis Company.

107. Automatic Battery Charger . . . An eight-page folder describing the Rectox Automatic Battery Charger produced by Westinghouse Electric Corporation. A short description of how the chargers work is included with material on applications and also material on specifications on materials and capacities.

No. 108—Industrial Trucks (electric) . . . Elevating platform type small industrial trucks, carrying, high-lift (tiering and telescoping) models—the full line of Wright Hibbard Industrial Electric Trucks Co., Inc., is described and illustrated in the company's catalog. For special applications the manufacturer offers variations from the standard line.

109. Keep 'Em Rolling . . . A four-page, two-colored booklet showing the uses of gravity conveyors for packaging and lightweight production installations. Descriptions of curved sections for this type of installation are included. A Speedways Conveyors, Inc., production.

110. Spot Conveying . . . A comprehensive bulletin by the Island Equipment Corporation describes a universal portable unit conveying system and its application in freight car loading and unloading, production line flow, packing and packaging operations. Flexibility of application and operation is emphasized with a great variety of use pictures included. Specifications on the equipment described are also included.

111. Mobile Swing Boom Crane . . . A description by the Silent Hoist & Crane Company of a general, all-around utility crane for use inside and outdoors. Equipped with rubber tires, the crane described is shown in applications for loading freight cars, trucks, and trailers, for storing and stacking materials in yards and stores, for lift and transporting materials in production lines, and for general maintenance work. Capacities and specifications are graphically presented.

112. Side Dump-Trailer Trucks and miscellaneous material handling equipment . . . Side-dump trailers and an Underslung Trailer are covered in a two-page pamphlet. Illustrations also cover special features. Complete engineering, construction and operation data are given. A second two-page pamphlet describes various models of two-wheel hand trucks, a beverage truck, a two-wheel milk can truck and an all-steel barrel and box skid. Dimensions, weights, applications and other pertinent information is included. Published by Palmer-Shile Co.

113. Motorized Handling For Lighter Loads . . . A 6-page brochure describing a new model of the Truck-man, designed especially for moving loads of one ton and lighter. Complete data cover all features recently improved, such as two speeds, steering, operator's seat, new motor-governor, larger gas tank, heavier load wheels, including other details. Available from Yardman, Inc.

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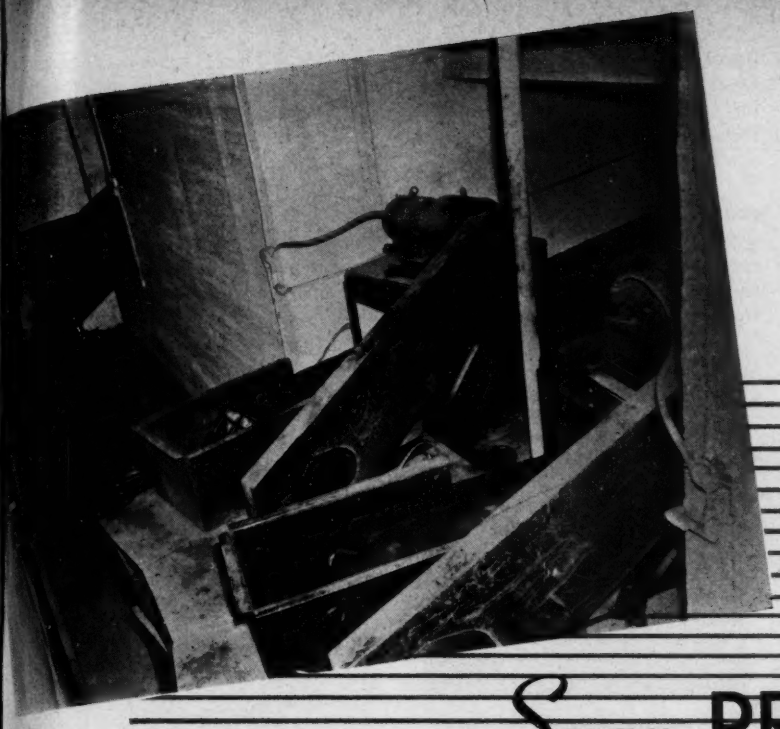


A view in the pit showing the three conveyors (from under the blankers) emptying into the flight conveyor. The latter moves the scrap to the crusher.

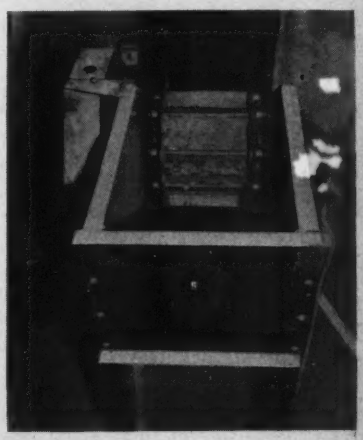
By F. C. WITTLINGER
Superintendent of Equipment and Methods
Delco Products Division
General Motors Corporation
Dayton, Ohio

LICKING *the* *Scrap* PROBLEM

The elimination of scrap material is of extreme importance in many manufacturing plants. Here's one plant where in excess of three tons of scrap is removed mechanically every day in a system specifically built for this job.

THE Delco Products Division of General Motors Corporation is one of the largest manufacturers of fractional horsepower motors in the world, and is the largest manufacturer of hydraulic shock-absorbers for automobiles. The motors are used in assemblies by many manufacturers of refrigerators, washing machines, ironing machines, pumps, etc. During the war Delco Products made many electrical instruments for military use.

The reconversion to civilian production did not involve any great



This photo shows the end point of long flight conveyor inside top of storage hopper, called "silo."

Outside view of huge storage hopper with housing for flight conveyor that moves tons of scrap daily. Hopper has capacity for 110 tons of scrap.

changeover. Motors continued to be the principal items of production. The flow of work in process had been constantly improved by the company and when the war came with its tremendous demands, this Division was able to do its share, having already installed efficient production and handling methods.

Many people think about moving material but seldom think about getting rid of scrap. The efficient manner in which our scrap problem was licked is a good example of improved handling.

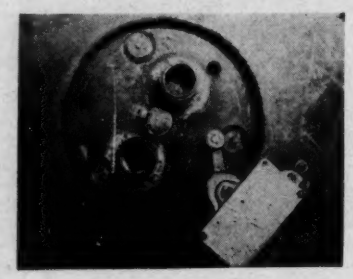
The "slug system" as it is known to our employees is a series of conveyors which takes away scrap from the blanking and piercing presses. High speed presses operating at 80 strokes per minute blank and slot parts for rotors and stators. There are 32

Where a 6" screw conveyor empties into 9" type.

slugs from the stator alone and 80 such laminations per motor. When it is realized that Delco Products produces about 1000 motors an hour, the scrap problem becomes one of disposing of some 2,560,000 slugs from the stators alone, plus the disposal of scrap from the rotors.

The blanking and piercing presses make up a line on the first floor of a seven-story building covering approximately a city block. To take advantage of gravity feed as scrap dropped through the presses, conveyors were installed in excavations beneath the footings of the building. For the most part, the slug line is underground.

Beneath the line of blanking presses from which the stators and rotors are blanked is a flight conveyor. Scrap drops down a chute from the press and falls into hinged sheet metal pans that make up the sections of carrying surface. Three such flight conveyors receive the scrap from the blanking presses and convey it to a point outside the building and underground. Here another flight conveyor travels at right angles to the three conveyors mentioned and receives the scrap from them. It is similarly designed and carries the scrap up an incline to a crushing mill. The scrap is crushed and



To start the system it is necessary to push the button for the conveyor desired. Automatically the conveyors start in sequence beginning with the final conveyor and ending with the selected conveyor.

wrinkled in the mill and drops carries the scrap to the top of a down a chute onto another similar flight conveyor. The last conveyor storage hopper into which it drops for storage.

Beneath the line of piercing presses from which the slugs from stator parts, etc., fall through chutes, there are two six inch screw conveyors. The screw conveyors are set in a metal trough and convey the scrap to a similar nine inch screw conveyor that travels at right angles to their path. This scrap is fed into a hopper through which it falls onto the flight conveyor that carries the scrap to the hopper above the silo. This scrap does not pass through the mill.

The use of the screw conveyors set in metal troughs solves the problem of handling the smaller pieces of scrap. The screw conveyor has no close fitting moving

Truck being loaded with scrap from "silo" hopper.

parts, and the trough has no small crevices; therefore, even tiny parts are conveyed without being jammed.

In the storage hopper, the larger pieces of scrap have a tendency to interlock or bridge and to prevent this, they are passed through a crushing mill where the flat pieces are bent and wadded up. Wet pieces tend to adhere to one another and flat pieces have a tendency to lap. The mill causes the scrap to "ball up" and makes it easier to remove scrap through the hopper.

On one side of the hopper there is a platform, beneath which a highway auto truck may be driven. A worker on the platform opens the door above a chute which allows the scrap to fall into the truck. A false floor set on an angle keeps scrap at such a level as to facilitate its removal through the chute from the hopper. The chute door can be opened by a hoist.

Mechanically Speaking

The success of the underground conveyor system in handling scrap has resulted in plans to expand the system.

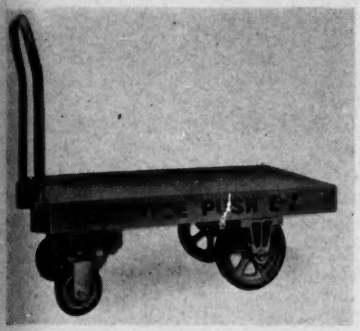
To control the flow and movement of scrap a central control board containing relays and resembling a telephone switchboard has been set up. Since practically all of the system is underground and out of sight, failure of any one of the screw or flight conveyors would not be noticed until material had become jammed and piled up at the point of failure. A silent watchman has been built into the electrical control of this system which checks a test circuit about every second and tells whether a certain conveyor is running or not. Electrical timers are energized by limit switches which are operated by cams on a rotating member of the conveyors.

As an example, at the end of the nine inch screw conveyor are three studs which rotate only if the screw turns. A sprocket chain drive turns the screw. If the screw conveyor jams, a shear pin breaks under the load and the driving unit keeps moving. But if the screw does not turn, the studs will not strike the cam which operates the limit switch. When the limit switch is out of action, an alarm sounds. If a conveyor fails, a horn sounds and a light goes dim, showing which conveyor is out of action. All conveyors immediately behind the one that fails then go out of action and automatically stop.

For additional information on these products, write Dept. 5, Flow Magazine, 812 Huron Rd., Cleveland 15.

Light-Weight Truck

AN ALL-MAGNESIUM alloy truck is announced by Service Caster and Truck Division of Domestic Industries, Inc., Albion, Mich. Known as Service Push-E-Z



model, the truck is designed for loads up to 6,000 lbs. It weighs ⅓ less than a comparable unit made of aluminum, according to the manufacturer, thus permitting easy operation. The new model was built in cooperation with the foundry division of Hills-McCanna Co., Chicago, which is at present promoting use of light metal for peacetime products.

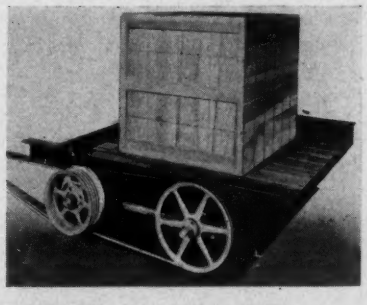
New Magnetic Overload and Jamming Relays

TO PROVIDE almost instantaneous magnetic overload protection on general purpose and mill motor applications, and to prevent damage to hoist, windlass and capstan equipment when the load or cable jams on marine control, a new type AYJ relay for d-c operation is now made available by the Westinghouse Electric Corporation.

The single-break normally closes main contacts and the double-break auxiliary contacts are suitable for carrying five amperes continuously and for interrupting a d-c inductive coil lead of 150-volt-amperes maximum. Type AYJ relays are operated by a series of copper strap wound type of coil. Coils and coil studs are available for currents ranging from approximately 75 to 625 amperes. The coils and auxiliary contact parts are insulated from the relay frames for 600 volts. Additional information may be obtained by writing the company, P. O. Box 868, Pittsburgh 30, Pa.

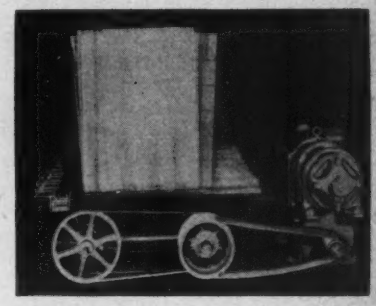
Vibrating Test Table

INFORMATION on a new test table that vibrates and shakes like a freight car, even to the pitch and toss, has just been released by the L.A.B. Corporation, Summit,



N. J. The device is designed to test packages and products to make sure that they will arrive in good condition. One hour's test will equal a coast-to-coast freight trip, according to the manufacturer's release.

Two eccentric shafts, one under each end of a strong table, cause the latter to vibrate with a circular motion in a vertical plane, and with a displacement about the same as the maximum deflection of average freight car springs and at a frequency similar to their frequency. The shaft at one end of the table can run either synchronously or out of phase with the shaft at the other end, or at a different speed. As a result, states the company, the table has a mixed motion and a



"pitch and toss" in addition to its vertical and horizontal movements. The package being tested repeatedly bumps a fence secured to the table, giving it shocks similar to car bumping or train jerks. Smaller packages may be stacked or larger boxes strapped down to duplicate actual freight car loading methods used.

Expanded Facilities

IN ORDER to meet current and future demands for its products, the Acme Steel Company recently completed a modern steel-and-concrete building addition to its Pacific Coast division headquarters at Los Angeles, Calif.

The new warehouse makes available additional space to stock Acme Steel Strapping and tools, Silverstitch Stapling wire and Silverstitcher stapling machines, thus providing better service to the company's customers in Southern California. Part of the additional building space will be used for manufacturing operations which, according to the company, will become increasingly important in view of expanding Pacific Coast trade and industry.

Articulated Truck

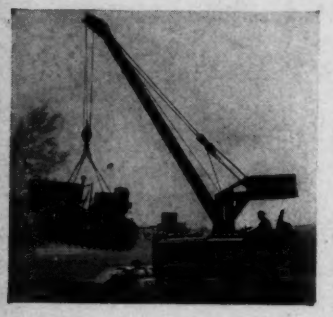
THE Baker Industrial Truck Division of the Baker-Rauland Company, Cleveland, O., announces a new 4,000-lb. capacity truck, known as Type AIHM Articulated Fork Truck, which is designed primarily for warehouse operation.

The manufacturer states that the new truck involves a revolutionary principle, permitting warehouse operators to increase the available storage area by cutting aisle requirements. The new design involves a method of steering by "articulating" the frame, permitting

swinging of the load to line it up in position without lining up the truck itself. Thus the model, it is claimed, requires about 3 ft. less aisle space for placing loads at right angles to the aisles. It needs less clearance on turns and, according to the manufacturer, speeds carloading or other handling operations where loads must be lined up or positioned in congested areas.

Mobile Crane

A NEW Roustabout Crane, Model MC-8, has recently been announced by the Hughes-Keenan Co., Mansfield, O., which handles loads up to 10 tons. It is a mobile full-swing boom crane, tractor mounted, that can readily be driven to any desired location. Booms of standard lengths from 15



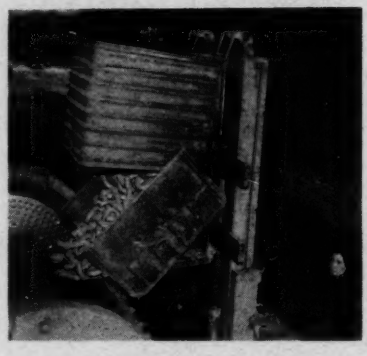
to 30 feet are furnished. Especially adaptable to the use of long booms, the MC-8 model will handle loads of nearly two tons at a 30-foot radius, 10 tons at nine feet, according to the company's announcement.

The ball-bearing boom turntable and all gears and clutches run in oil, and are fully enclosed. Boom swing and hoist and load hoist are all independent actions, with separate controls and automatic brakes. The rugged construction of the MC-8, it is said, makes it suitable for loading, unloading, moving or stacking of heavy, bulky objects, especially outside the range of big overhead cranes or where none are available.

Dumping Attachment

THE Mercury Manufacturing Company, Chicago, recently perfected an attachment for Mercury Hydraulic Fork Trucks, which makes it possible for the operator of the truck to dump automatically the contents of a box skid while the load is in a raised position.

The box skids used are of a special hinged bottom design. The photograph illustrates how loops welded to the box are engaged by



hooks on the top of the truck's movable uprights, causing the bottom of the box to fall away when the forks are lowered. Attachments welded to the uprights of the truck enable the operator to trip the load at pre-determined heights, it is stated.

Utility Truck

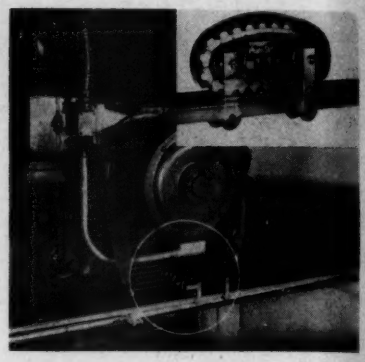
DRINKWATER, INC., Chicago, announces a patented Utility Truck, shown here. Designed for quick and easy handling of parts, equipment and supplies in plants, the truck has a short wheel-base making for easy maneuverability, according to the announcement.

Steel bed and platform of the new unit are seamless one-piece

construction. All corners are rounded, edges reinforced, and corner guards give maximum rigidity and protect corners of loads. The platform is removable, and each truck can carry from one to four platforms and so accommodate a variety of items at one time. The rubber tires are noiseless and are designed for lighter loads up to 600 lbs. Plastic wheels are provided for heavier loads. The base of the truck is 23⅛" wide and 33⅜" long. The height from floor to handle is 36".

Rubber-Insulated-Trolley

A NEW fully rubber-insulated trolley, claimed to be suitable for virtually every type of electrically operated mobile equipment, is now offered by the Benbow Manufacturing Co., San Francisco, Calif. Cranes, monorails and port-



able tools are among the types of equipment mentioned by the company. The insulated TracTroly meets safety code requirements, according to the manufacturer.

The TracTroly system consists of a copper conductor in standard 10-ft. lengths encased in a slotted rubber rack supported by a rigid backing; and individual traveling collectors which employ an endless chain, like a tractor tread, to effect positive six-tooth multiple contact at all times.

Neoprene Type Tires

INDUSTRIAL solid tires of neoprene type synthetic rubber will be in production during the weeks before the first of the year, according to an announcement by the United States Rubber Co. The new special-purpose tires are designed primarily for use on electric and gasoline powered trucks and manually operated material handling equipment, where minimum rolling resistance is a prime necessity.

"Extensive testing of neoprene industrial tires indicates their performance more nearly aproaches that of natural rubber than any of the other synthetic rubbers," W. D. Baldwin, U. S. Tires sales manager, stated. Mr. Baldwin explained that the availability of neoprene

for solid tires was made possible through the removal of wartime restrictions.

Split Type Wheels

AIRCRAFT MECHANICS, Inc., Colorado Springs, Colo., announces cast aluminum industrial wheels that are easily mounted to solid rubber or zero-pressure rubber tires without the use of any tire-fitting tools. The two wheel halves are designed to fit readily into the tire, and then become securely seated as the wheel bolts are tightened. Standard models feature dustproof bearings, according to the manufacturer's statement.

Lamps for Vibration Service

SPECIALLY designed incandescent lamps for marine, power plant and industrial equipment operations, where there is constant jar and vibration from heavy or high-speed machinery, are now made available by Sylvania Electric Products Inc. Rated at 50 and 100 watts, vibration resisting filaments for vertical lamp burning are designed to give 1000-hour life. Bulbs include clear and inside frosted types, and are packed in standard units of 120 lamps for 115, 120 and 125 volt service.

Crawler Shovels and Cranes

FOUR new, heavy-duty machines announced by The Thew Shovel Company, Lorain, O. The line, designated as the Lorain "41" series, consists of a chain-drive crawler model and three rubber-tired machines, one with 4-wheel drive, one with 6-wheel drive, and a third of

the self-propelled type. The accompanying photos illustrate (top) the chain drive crawler shovel and (bottom) the 4-wheel drive Moto-Crane.

The two-speed crawler machine features a new mounting that is longer, wider and heavier. Standard treads are 30" wide and travel speeds, in either direction, are ¾ and 1⅝ miles per hour. The unit has increased capacities for crane, clamshell and dragline operations, according to the manufacturer.

The 4-wheel drive Moto-Crane is of 20-ton capacity with specially designed 6-wheel carrier for shovel and crane loads. With 10 speeds forward and two reverse, this new rubber-tired machine is claimed to have a speed range of from one to 28 miles per hour. Travel power is

supplied through two worm-driven axles to four dual-tire rear wheels, which are equipped with air brakes.

Our MGC Charger adds to the lives of our truck batteries
• Quick, dependable charging is a MUST for your truck batteries – and the MGC Charger can give it to you! It's unusually compact and light in weight. It's a two-bearing unit, squirrel cage AC rotor and DC generator armature are mounted on a solid shaft, supported at each end by oversized gearings. Four models – Single Circuit, Two Circuit, Three Circuit, Four Circuit – for charging one, two, three and four batteries simultaneously. Fully automatic. Write requirements and we'll send specifications for equipment.
Motor Generator Corp., Box FL-16, Troy, Ohio
(Division of HOBART BROTHERS COMPANY)

Scoop With Built-In Sleeves

In handling large quantities of metal borings and turnings for shipment to smelters, a motor car company uses a scoop of novel design, enabling it to transport metal from storage bins to trucks or freight cars by means of a power truck equipped with a swivel-mounted fork.

The scoop is made of steel plates welded together, in a boxlike structure that is open at the top and front end. Two separate sleeves to receive the fork's tines are welded to the bottom plate, inside the scoop. A portion of each sleeve extends through an aperture cut in the rear plate. This causes the scoop to be set well out in front of the truck, one advantage being to protect the truck's rubber tires. The upper front edges of the scoop are cut away at an angle to facilitate its penetration into the metal.

In operation, the tines are inserted in the sleeves and the truck

pushes the scoop into a pile of loose metal. Due to the tilting mechanism on the forward part of the truck, the course of the scoop is both forward and upward. To clear obstructions, the load is carried in an elevated position, with the scoop at an angle of about 45° from horizontal, in order to hold the maximum amount of material. (Maximum elevation is 117 inches.) The scoop is emptied by being turned over by means of the truck's rotating device. *Courtesy, The Elwell-Parker Electric Co.*

You'll Read It In February

A single plant installation serves a half dozen different operations—through receiving, assembly, finishing, etc., and shipping. It's about a standard device plus human ingenuity. . . . A manufacturing chemist uses a highly efficient system for feeding millions of empty units to high-speed packaging lines.—You'll read these and othes stimulating reports in FLOW for February.

What Makes the LOW-COST RADIO?

Its low-cost handling, made possible by the elimination of unnecessary motions, as shown here.

JUST imagine a small home-radio coming off an assembly line every 35 seconds! Only a modernized line can perform that feat—one the plans for which have been subjected to the severe scrutiny of the micro-motion analyst. Right now many such lines are busily engaged in endeavoring to meet the pent-up demand for radios.

What is the secret of this high efficiency? It lies in thoroughly covering the following five factors, which apply whether a material handling project involves the setting up of a circus tent or a radio assembly line:

1. All material is delivered to the location where it is required, without any unnecessary movements, shortly before it is to be assembled.

2. Each individual involved in the work has certain operations to perform; and each one is thoroughly trained and skilled in his work, with a definite sequence of operations.

3. The system must provide for removal of the finished product promptly, efficiently and in a steady flow.

4. The operations must be so segregated and individuals so assigned that balanced operations exist throughout at all times.

5. The output is governed by the movement of the adjustable speed of the assembly conveyor. Each operating speed requires a predetermined number of operators, with a different segregation of the work.

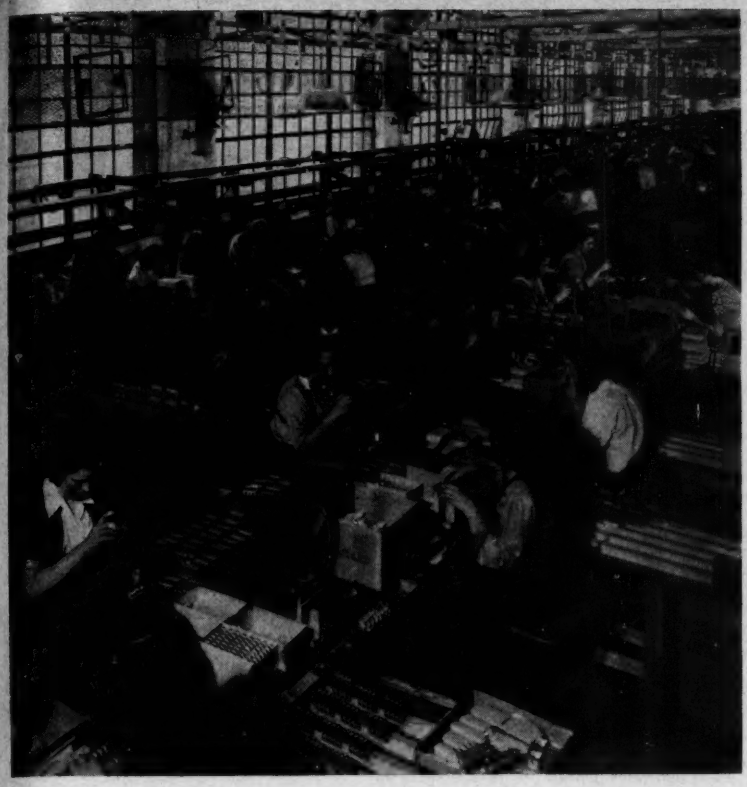
Putting It Together

Usually, as in this case, the main assembly line is a chain conveyor, flush with the top of the bench and at a convenient working angle. The chasses are placed in carriers which can be seen suspended over the line being returned to the starting station. The carriers ride on the chain through the entire process of the assembly.

The cabinets and the chasses, the only bulky parts required for these small sets, are fed to the assembly line continuously. While the cabinets are fed on a powered belt conveyor, the chasses are stacked on three-walled built-up pallets that are moved into position either by a fork truck or a pallet hand lift truck directly from the press room. The subassemblies, prepared on adjacent benches, are placed in caster-mounted stacking racks upon completion. They are then moved to the point in the line where they are required.

The small tubes are consumed in considerable volume, and therefore require a very close control to keep pilferage and breakage to a minimum. They are pretested and fed continuously to the line at the final test stations. All work is kept conveniently at the working level and in the correct position laterally.

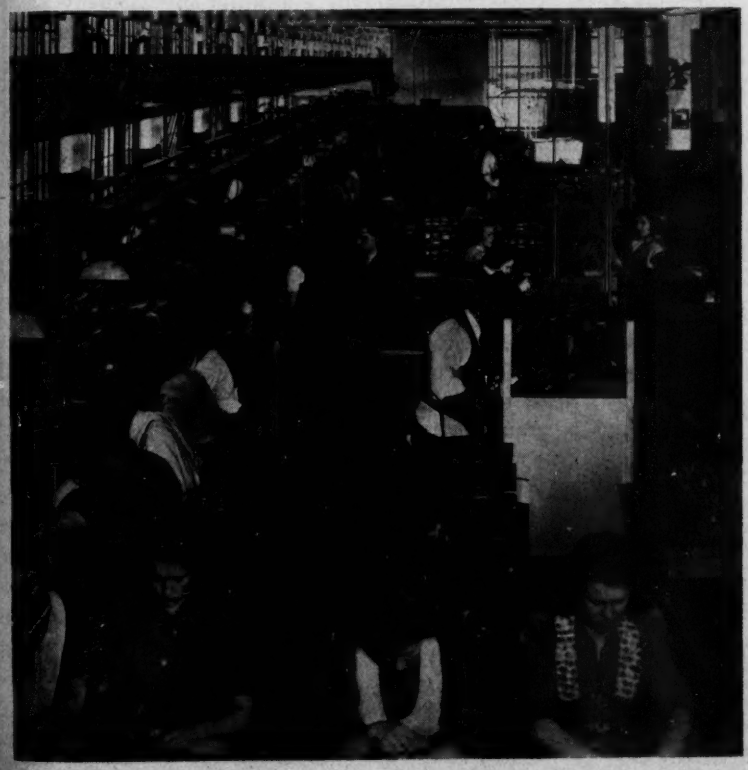
After passing test, the completed sets are placed in cartons with carefully designed inserts to withstand shock in transit. Then they



A subassembly bench supports conveyor, background. Note chassis carriers on conveyor bench.

move over a series of chutes and conveyors directly into freight cars or trucks. Should it be necessary to store the radios prior to shipment, then they are palletized directly from a conveyor in the warehouse, from where they can be moved to the shipping platform.

Part view of sub- and final assembly. Carriers are returned to start of line on chain conveyor.



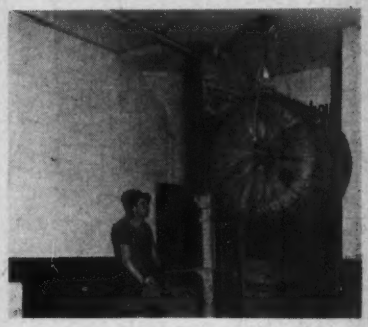
IT COSTS TOO MUCH . . . NOT TO

(Continued from page 15)

mistakes or delays, but also enabled the paper work to keep pace with the power handling.

Special Trucks for Special Jobs

Meantime, specialization of equipment had also entered the picture. That is to say, as rolls of newsprint, bales, coils and similar bulky items had to be handled, we added special machines for moving these products with least effort.



A heavy coil being handled by crane type truck.

An example is a truck with a special attachment for handling individual rolls of newsprint. This is shown in one of the photos. While, previously, three men were required to break over one of these 1,800-lb. rolls, today the truck operator does it alone, and without any effort on his part. After he has pushed the "shovel" under the roll, he simply inserts the plug in the core and tilts the upright back.

Another machine that has eliminated back-breaking labor is the truck with a crane attachment, also shown in one of the photos. The short boom is especially de-

Attachment on truck that handles newsprint rolls.

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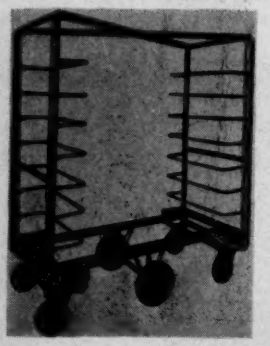

● Quality floor trucks for every materials handling purpose. Special trucks designed and built to meet your individual requirements. Without obligation, consult our Engineering Department.

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signed for close-in work, which made it suitable for our requirements. The size of coil shown may weigh anywhere from 800 to 1,200 lbs., depending on whether it is wire, cable or rope. It would take six men to handle such a heavy coil manually, particularly if it were to be stacked. This truck not only stacks such coils with ease but also loads them in outbound vehicles completely eliminating the hazard that usually attends manual handling.

Location System

Occasionally I am asked questions about the location system in a general merchandise distributing warehouse, so I shall add a few words on this subject. The merchandise in the warehouse comes under the supervision of a section foreman, who allocates a lot and section number to the merchandise being received. These two numbers are placed on the receiving ticket, which is sent to the office and recorded on the inventory record of the customer.

If a customer sends successive lots of the same merchandise over a period of time, for example, each individual lot is properly designated (and kept separate) by lot number. The latter, of course, appears on the receipt issued to the customer, who is instructed to order by lot number.

His order for delivery is transposed to the warehouse release

Paper has been picked up, plug inserted in core.

form, and the inventory clerk indicates the location of the particular lot to the delivery personnel. Thus the warehouseman does not have to decide as to which of several lots to send—and the customer is enabled to take out the older merchandise first.

Changing the Emphasis

"Does it pay to modernize?" I don't believe that is quite the proper form for this question. I think it should be: "How much does it cost *not* to modernize?"

In our case, our excess costs were considerable during the years before we modernized. Due to the reduced costs that resulted, our modernization program enabled us to weather a critical period and meet competition. And, once modern methods, properly applied, are installed and operating satisfactorily, they continue to pay dividends over the years. One must, however, keep abreast of new developments and not be complacent. Constant striving is necessary to improve practices and meet changing conditions.

LETTERS TO FLOW . . .

(Continued from page 4)

in one tier. Those of other widths are stored in other tiers.

When a truck or carload of sheets is received by us from the mill, each sheet has to be unloaded from the truck by hand, one at a time, and placed in the proper rack. It takes five men an hour or two to unload a truckload, which is certainly very wasteful of manpower.

We have checked with a number of companies here in Chicago which likewise use rather large quantities of varying sizes and gauges of sheets, and they all seem to handle this material in the same manner. The steel warehouses unload and load the sheets by cranes in lifts, storing them on the floor and not in racks. The steel warehouses have a great deal of floor space and they can spread the lifts of steel sheets out over a large floor area without too much difficulty. Such a quantity of floor space and crane facilities are not ordinarily available in a manufacturing shop.

We would like to know if you have heard of any company which uses quantities of steel sheets and has developed some practical method of storing sheets so that they can be unloaded from trucks or cars by lifts and stored without taking up too much floor space. Possibly some of the automobile body manufacturers in Detroit have developed some good system. We will appreciate any suggestions you may have on this.—M. W. George, Vice-President, B. I. Weller Co., Chicago.

While we are checking into the problem, can any reader make a suggestion that will be helpful to the B. I. Weller Co.? The lifts, either strapped to dunnage or placed on wood decking, depending on the gauge of the steel, would save much individual handling. So the problem is one of providing vertical storage for the lifts, without sacrificing accessibility to the material.—Ed.

To FLOW:

Solution in the Offing

While we are extremely interested in the possibility of shipping unit palletized loads, we have never been able to justify this method of shipping on a dollars and cents basis.

To the best of our knowledge, the savings of manhours in loading and unloading palletized loads do not offset the cost of freight on the pallets themselves, particularly if the freight has to be paid both ways as is the case when returnable pallets are used. Even with the use of the cheapest and lightest disposable pallets, we have not in our own minds been able to justify the use of the palletized loads.

To our mind the cheapest method is to bring the pallets directly into the car and hand pile the load from the pallet to the car, and at the other end of the line to have the contents of the car loaded on pallets.

Until such a time as the railways are willing to recognize the value of reduced terminal time on freight cars, by the use of palletized loads, and are prepared to ship pallets at least at a reduced rate on the return trip, we cannot see how it is economically sound to ship palletized loads.

Our reasons for writing are not to disagree with the use of palletized loads for rail shipment, but we are anxious to learn if you have any facts available that would enable us to justify their use.

We can see the advantage in saving on palletized loads when the pallet is used as the prime container. But where the merchandise of necessity must first be packed in either shipping containers or bags, the savings do not seem to show. —J. R. Annett, The Canada Starch Co., Ltd., Montreal.

You are correct—at the moment. However, indications are that fair tariffs will be forthcoming early in 1946. The Ford Company recently reported considerable progress in this direction. It should be added that many companies are able to effect other economies—for example, lower packing costs, and less damage.—Ed.

SMALL, MEDIUM, LARGE . . .

(Continued from page 24)

from which you cannot derive benefits if you do not put united effort behind it; and, unfortunately, the results obtained are in a lesser proportion as the effort falls short of being all-out and inspiring.

The Navy Did It

An undertaking of this vast scope approaches that of the Navy during wartime, except that with less volume to handle (and therefore less manpower) the peacetime turnover is also lower. The Navy program had the equivalent M. H organization in each supply depot corresponding to that of a large plant. It was necessary to augment this activity with area M. H. officers. Their primary function was to institute unit loads at naval contractor's plants, the source, so that the handling could be minimized in moving the palletized units through all successive handlings to the point of consumption.

The Navy program moved up to 150,000 cars per month, a large portion of which had to be transported 5,000 to 7,000 miles. How can the success of this vast program be explained? It was largely due to the following three factors:

1. Standardization of modern equipment and up-to-date practices.

2. An adequate and effective educational program utilizing all known aids.

3. The whole-hearted determination of men in the service of their country, and from industry, with a knowledge of what had been accomplished and vision for pioneering in hitherto unknown fields.

Let us look at the record, which reveals some outstanding facts. In one instance, the Navy moved 225,609 tons by trailer and truck in unit loads. The unloading of this material consumed 3,223 manhours, compared with an estimated 90,243 hours if this volume had been handled as loose cargo. This precious saving amounted to 87,202 manhours. In another case a railroad unit load movement effected an increase in tons moved from 2.5 to 11.1 tons per manhour. The Stevedoring Section actually increased the tonnage loaded aboard ship (using the usual gang of men) by as much as 2½ times the usual rate. This was done by the use of unit loads and by employing mechanical equipment wherever possible. While this condition was not an average improvement, the turnaround time was reduced considerably.

A Lesson For Industry Today

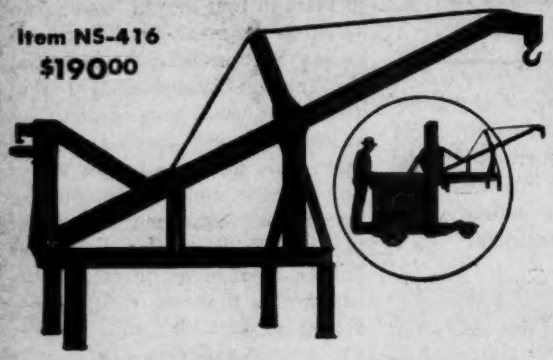
Industry cannot afford *not* to take advantage of the unusual progress made during this "War of Supply." It cannot afford not to adopt a program for material handling improvements patterned after one of the three plans, previously outlined, that is applicable. In this connection, it is well to bear in mind that products must be packed right to permit proper handling. When you contemplate changing either an incoming or an outgoing pack or unit load, get a breakdown of material and packing costs. When you have obtained these, endeavor to keep the proposed within the former costs so that all handling savings may be actually realized. Modern material handling techniques can be applied almost clean across the board—from procurement through distribution. This is a challenge to management.

As a last plea, give this function in your organization the place and prestige which it rightly deserves. Then, and only then, will you be able to obtain maximum benefits.

MODERN DEVICES DO A JOB

A leading automobile manufacturer's postwar production schedule called for double the previous output—and the requirement was met with practically no increase in floor space. Company engineers attributed this result chiefly to modern handling devices. A FLOW article in February tells how this production feat was accomplished offers plenty of useful ideas for readers in other fields.

Item NS-416
$190.00



Boom Skid *For Your Lift Truck*

Makes a "Boom" truck out of any standard high-lift truck, also made for use on fork trucks. For picking up and moving heavy objects. Made of fabricated steel, all welded construction. Capable of handling any weight load allowed by your truck balance. Boom 114" long overall, base 54" long. Legs 12" high. Weight 350 lbs. When ordering give platform or fork dimensions of your truck, also height of your platform at low position.

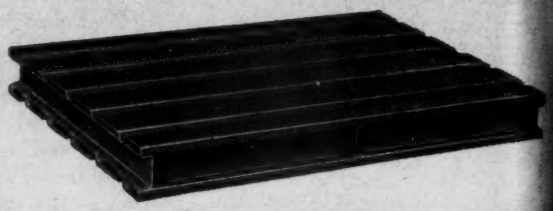
When Ordering always give "Item" number; this will help prevent error. All prices are f.o.b. Detroit.

Carboy Truck

Item B-488 **$38.00**

Roll the truck up against carboy and drop gripping yoke over the top as illustrated; then pull back on truck handles and loading becomes automatic. Hardened steel studs on the truck frame hold load in place. To unload simply tip truck forward and release gripping yoke. This truck can save a lot of dangerous, heavy lifting, avoid costly accidents, and speed up an otherwise slow and cumbersome task.

All steel welded construction. Well shaped, curved handles provide secure grip. Overall width only 20" which permits passage through narrow doorways and crowded aisles. Overall length 48" and well balanced for easy handling. Two 8" by 2" roller-bearing wheels afford easy wheeling of even the heaviest load. Capacity 500 lbs. Weight 75 lbs. Air dry enamel finish.



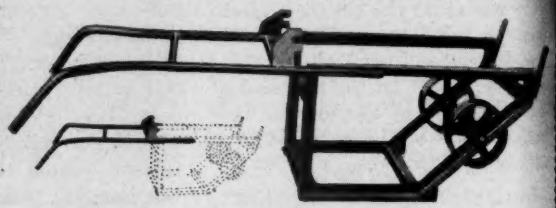
All-Metal Pallet

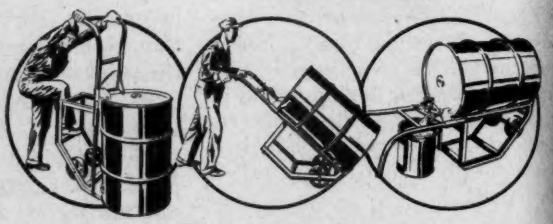
Item B-413

Above is illustrated a double faced, corrugated, special rolled steel pallet, having three 3" channel separators to provide entrance for lift forks.

All Palmer-Shile Company Pallets are built to fit specific requirements or to meet buyers' specifications. Either tell us what you wish to accomplish and we will then submit our recommendations, or send us your specifications and quantity desired, on receipt of which we shall be pleased to quote you.

We build all types of pallets, any size, any capacity.





Combination Truck and Drain Rack
Loads Automatically

As truck is tilted against drum, steel fingers grip the flange at top. Loading is completed as truck is rocked back to wheeling position. Free-rolling wheels make light work of trucking the heaviest drums. Slight downward push on handles lays truck on floor with wheels raised free, thus providing convenient draining position. Heavy angle iron frame, tubular handles, all welded construction. Two 8" roller bearing wheels. Weight 90 lbs.

Detachable Handles. When used as drain or storage rack, handles can be detached. Thus conserving floor space and permitting one pair of handles to serve any number of trucks.

Item NS-506 **$42.50** (Handles welded to frame)
Item NS-506-R **$32.50** (Item NS-506-DH without handles)
Item NS-506-DH **$44.50** (Truck and detachable handles)
Item NS-506-H **$12.00** (Detachable handles only)

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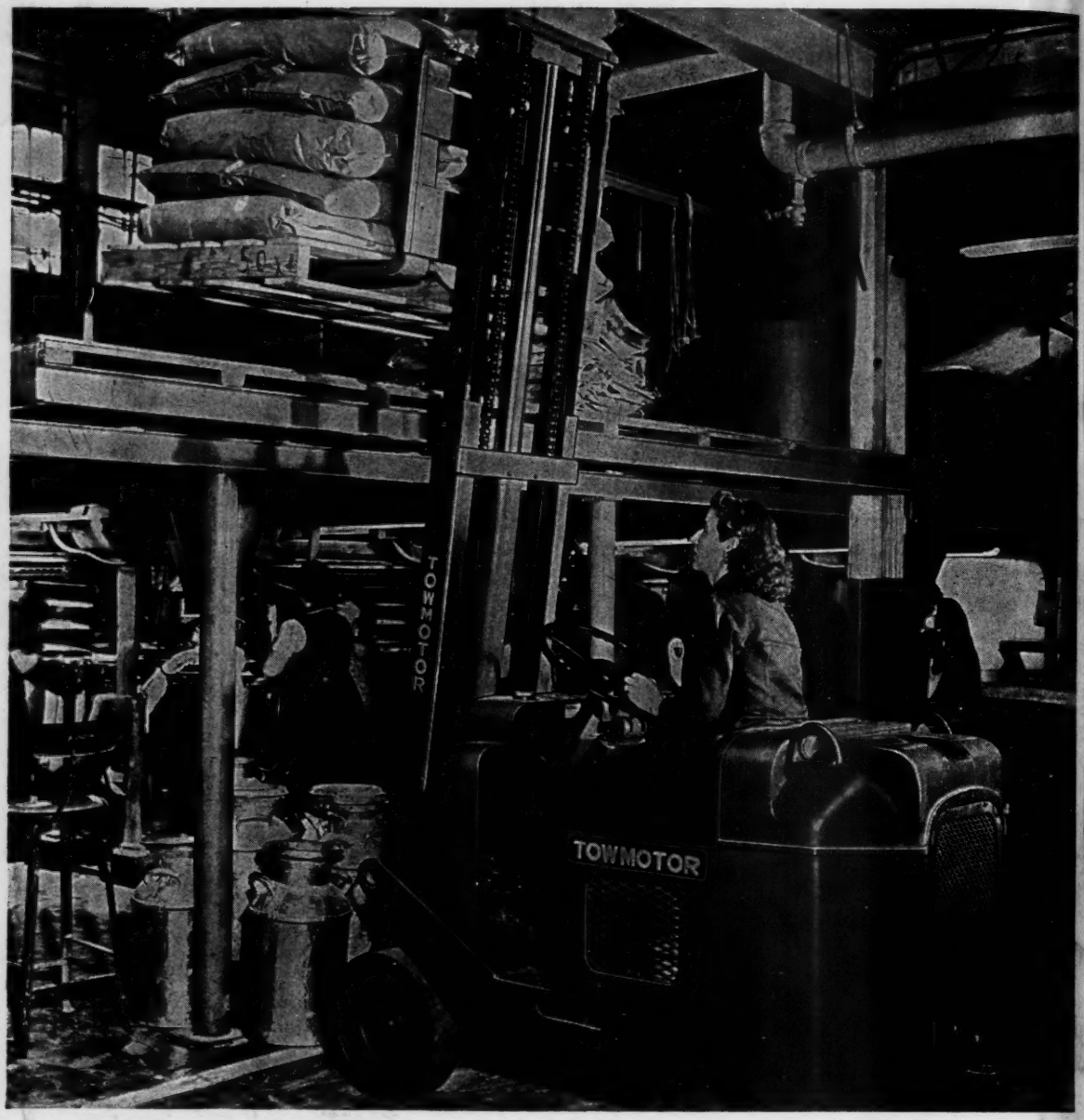
TROLLEY CONVEYERS

Engineered to serve Production

Trolley Conveyers are being applied in modern foundries for handling materials, usually cores and castings, through Production Departments, from one building to another, and in many other ways are operating to serve production. Transverse bends lower the loads to working height, keeping a continuous flow of materials reaching the working area. The conveyers do their work without occupying valuable floor and aisle space. They can serve one or several floor levels, and can be applied inside or outside the buildings. Variable speed drives make possible the exact control of the material reaching the working areas and the many types of hangers available add to the flexibility of the conveyers. Mathews Trolley Conveyers, like other prominent Mathews types for foundry application, are on the job today in many of the nation's great foundries. A Mathews Engineer operates in your vicinity, and would appreciate an opportunity to help you with that conveying problem.

Mathews Conveyer Company

ELLWOOD CITY, PENNSYLVANIA



S-T-R-E-T-C-H-I-N-G A BOXCAR

IN THE EARLY STAGES OF THE WAR, a serious shortage of shipping space threatened supply lines to Europe and the Pacific. Aiding in the urgent search for a solution to the problem, The Cambridge Tile Manufacturing Company, Cincinnati, successfully completed an experiment in compressing three carloads of dried whole egg powder and loading them into a single boxcar.

Presses that had been used to compress clay into Suntile were quickly converted into food compression equipment through the use of new dies designed and built in Cambridge Tile's own shops. Facilities were rapidly expanded to meet the ever increasing demand of the Armed Service Forces for compressed emergency rations. But the conversion created handling problems that throttled production and prevented full utilization of the extra shipping space made available by the new food compression method.

So Towmotor engineers were called in to install a modern materials handling system. 100-pound bags of dried food powders were loaded on pallets in the receiving room and fed to the production line in a continuous, controlled stream. The finished cakes of compressed food were packed into shipping cartons, assembled into large unit loads, and moved directly into the boxcars by one girl and a Towmotor. Work schedules were accurately timed to provide maximum output per man and machine. Closer inventory control eliminated delays and tie-ups. Production speed was increased to machine capacity, freed from the limitations imposed by slow handling methods. Most important, Towmotor made possible immediate and full utilization of every foot of shipping space.

The results achieved at Cambridge Tile are typical of Towmotor installations throughout industry. The know-how and experience that contributed numerous opportunities to increase productive output also enabled Cambridge Tile to effect savings of $1,000 a month in handling costs alone. The Towmotor Materials Handling Analysis Guide, a product of know-how and experience, will greatly simplify your handling problem; send for a copy today. Towmotor Corporation, Div. 12, 1226 East 152nd Street, Cleveland 10, Ohio.

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